

**SAW MILL PUMP STATION UPGRADES
CONTRACT No. 2021-05
VILLAGE/TOWN OF MOUNT KISCO
WESTCHESTER COUNTY, NY**

**BID DOCUMENTS AND
TECHNICAL SPECIFICATIONS**

**VILLAGE OF MOUNT KISCO
104 MAIN STREET
MOUNT KISCO, NEW YORK 10549**



Prepared by:



**DELAWARE ENGINEERING, D.P.C.
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October 2021

**SAW MILL PUMP STATION UPGRADES
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NOTICE & INVITATION TO BID

**SAW MILL PUMP STATION UPGRADES PROJECT
CONTRACT No. 2021-05
VILLAGE/TOWN OF MOUNT KISCO
WESTCHESTER COUNTY, NEW YORK**

NOTICE IS HEREBY GIVEN that sealed bids will be received at the **Village/Town of Mount Kisco Village Hall**, Attention: Ed Brancati, Village Manager, 104 Main Street, Mount Kisco, NY 10549 until **11:00 a.m.** local time of **December 13, 2021** and then at said office publicly opened and read aloud for work that shall include but is not limited to:

Upgrades to the Saw Mill Pump Station including new pumping systems, influent grinders, piping modifications, control system upgrades and general building upgrades, roof replacement, electrical upgrades to the Saw Mill Pump Station including a new back-up propane/natural gas generator and service gear, HVAC upgrades, and plumbing upgrades.

Completion milestone for the project is: substantial completion within 350 days.

M/WBE requirements for this project are 20%.

There is a project labor agreement (PLA) for the project.

Bidders are invited to view the opening in person at Village Hall or via Zoom Meeting teleconference, **Meeting ID: 886 3369 1521** or by going to <https://us02web.zoom.us/j/88633691521>.

All bidders are strongly encouraged to visit the work site. Any questions should be directed to Robert Flores, P.E., Delaware Engineering at rflores@delawareengineering.com

Bids should exclude sales and compensating use taxes on materials incorporated into the work. A bid bond in the amount equal to at least five (5%) percent of the Bid will be required with submission of each bid. The successful bidders, to whom the contracts are awarded, will be required to provide a payment and performance bond equal to the full amount of the Contract. Bids will be received on an itemized unit price basis. The Contractor must ensure that employees and applicants for employment are not discriminated against because of their race, creed, color, religion, sex or national origin. New York State and Federal Prevailing Wage Requirements shall apply to this project.

No bids will be received or considered after the time state above. One original and one copy of the bid forms must be submitted in a sealed envelope bearing the name and address of the bidder and clearly marked **“Contract 2021-05 – BID FOR SAW MILL PUMP STATION UPGRADES PROJECT.”**

Digital copies of the Contract Documents may be obtained online as a download for a nonrefundable fee of Forty-Nine Dollars (\$49.00) from the website: www.debiddocuments.com under 'public projects.' Complete hardcopy sets of bidding documents may be obtained from REV, 330 Route 17A, Suite #2, Goshen, NY 10924, Tel: 1-877-272-0216, upon depositing the sum of One Hundred Dollars (\$100.00) for each set of documents. Checks or money orders shall

be made payable to Delaware Engineering, D.P.C. Cash deposits will not be accepted. Any Bidder requiring documents to be shipped shall make arrangements with REV and pay for all packaging and shipping costs.

Drawings and Specifications will be available for viewing at the Village/Town of Mount Kisco Village Hall, 104 Main Street, Mount Kisco, NY 10549 between the hours of 9:00 a.m. and 3:00 p.m., Monday through Friday.

A pre-bid conference will be held on **November 16, 2021** at **9:00 a.m.** at the Saw Mill Pump Station. Bidding contractors are strongly encouraged to have an authorized representative of their firm present at this meeting.

The Owner reserves the right to waive any informalities or irregularities in the Bids received, or to reject any or all Bids without explanation.

Edward W. Brancati
Village Manager
Village/Town of Mount Kisco

Date of Publication: November 2, 2021

Instructions to Bidders

INSTRUCTIONS TO BIDDERS

1.0 DEFINED TERMS

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

2.0 COPIES OF BIDDING DOCUMENTS

- 2.1 Complete sets of Bidding Documents must be used in preparing Bids; neither OWNER nor ENGINEER assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- 2.2 OWNER and ENGINEER in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids on the work and do not confer a license or grant for any other use.

3.0 QUALIFICATIONS OF BIDDERS

To demonstrate qualifications to perform the work, each Bidder must submit written evidence, such as financial data, previous experience, present commitments and other such data as may be called for in the statement of qualifications form attached hereto. Each Bid must contain evidence of Bidder's qualification to do business in New York State or covenant to obtain such qualification prior to award of the contract.

4.0 EXAMINATION OF CONTRACT DOCUMENTS AND SITE

- 4.1 It is the responsibility of each Bidder before submitting a Bid, to (a) examine the Contract Documents thoroughly, (b) visit the site to become familiar with local conditions that may affect cost, progress, performance or furnishing of the Work, (c) consider federal, state and local laws and regulations that may affect cost, progress, performance or furnishing of the Work, (d) study and carefully correlate Bidder's observations with the Contract Documents, and (e) notify ENGINEER of all conflicts, errors or discrepancies in the Contract Documents.
- 4.2 Reference is made to the Supplementary Conditions for identification of each of the following:
 - 4.2.1 Those reports of explorations and tests of subsurface conditions at the site which have been utilized by ENGINEER in preparation of the Contract Documents. Bidder may rely upon the accuracy of the technical data contained in such reports but not

upon non-technical data, interpretations or opinions contained therein or for the completeness thereof for the purposes of bidding or construction.

- 4.2.2 Those drawings of physical conditions in or relating to existing surface and subsurface conditions (except Underground Facilities) which are at or contiguous to the site which have been utilized by ENGINEER in preparation of the Contract Documents. Bidder may rely upon the accuracy of the technical data contained in such drawings but not upon the completeness thereof for the purposes of bidding or construction. (See Soils Information in Exhibit E.)

Copies of such reports and drawings will be made available by OWNER to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the technical data contained therein upon which Bidder is entitled to rely as provided in this paragraph and 4.2.1 are incorporated therein by reference. Such technical data have been identified and established in the Supplementary Conditions. (See Soils Information in Exhibit E.)

- 4.3 Information and data reflected in the Contract Documents with respect to Underground Facilities at or contiguous to the site are based upon information and data furnished to OWNER and ENGINEER by owners of such Underground Facilities or others, and neither OWNER nor ENGINEER assumes responsibility for the accuracy or completeness thereof unless it is expressly provided otherwise in the Supplementary Conditions.
- 4.4 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders on subsurface conditions, Underground Facilities and other physical conditions, and possible changes in the Contract Documents due to differing conditions appear in Paragraphs 4.02 and 4.03 of the General Conditions.
- 4.5 Before submitting a Bid, each Bidder will, at Bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests and studies and obtain any additional information and data which pertain to the physical conditions (surface, subsurface and Underground Facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance or furnishing of the Work and which Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price and other terms and conditions of the Contract Documents.
- 4.6 On request in advance, OWNER will provide each Bidder access to the site to conduct such explorations and tests as each Bidder deems necessary for submission of a Bid. Bidder shall fill all holes, clean up and restore the site to its former condition upon completion of such explorations.
- 4.7 The lands upon which the Work is to be performed, rights-of-way and easements for access thereto and other lands designated for use by CONTRACTOR in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by CONTRACTOR. Easements for permanent structures or permanent changes in existing

structures are to be obtained and paid for by OWNER unless otherwise provided in the Contract Documents.

- 4.8 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Contract Documents and such means, methods, techniques, sequences or procedures of construction as may be indicated in or required by the Contract Documents, and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

5.0 INTERPRETATIONS AND ADDENDA

- 5.1 All questions about the meaning or intent of the Contract Documents are to be directed to ENGINEER. Interpretations or clarifications considered necessary by ENGINEER in response to such questions will be issued by Addenda mailed, faxed or delivered to all parties recorded by OWNER as having received the Bidding Documents. Questions received less than ten (10) days prior to the date for opening of Bids may not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
- 5.2 Addenda may also be issued to modify the bidding Documents as deemed advisable by OWNER or ENGINEER.

6.0 BID SECURITY

- 6.1 Each Bid must be accompanied by Bid security made payable to OWNER in an amount of five percent of the Bidder's maximum Bid price and in the form of a certified or bank check or a Bid Bond (on form attached, if a form is prescribed) issued by a surety meeting the requirements of Paragraphs 5.01 and 5.02 of the General Conditions.
- 6.2 The bid bond must be accompanied with a dated Power of Attorney certification
- 6.3 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Agreement and furnished the required contract security, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Agreement and furnish the required contract security within fifteen days after the Notice of Award, OWNER may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom OWNER believes to have a reasonable chance of receiving the award may be retained by OWNER until the earlier of the seventh day after the Effective Date of the Agreement or the forty-fifth day after the Bid opening, whereupon Bid security furnished by such Bidders will be returned. Bid security with Bids which are not competitive will be returned within seven days after the Bid opening.

7.0 CONTRACT TIME

The numbers of days within which, or the dates by which, the work is to be substantially completed and also completed and ready for final payment (The Contract Time) are set forth in the Bid Form and the Agreement.

8.0 LIQUIDATED DAMAGES

Liquidated damages, if any, are stipulated in the Standard Form of Agreement of these contract documents.

9.0 SUBSTITUTE "OR EQUAL" ITEMS

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

10.0 NON-COLLUSION AFFIDAVIT

- 10.1 Each Bidder submitting a bid for any portion of the work contemplated by the documents on which Bidding is based shall execute and attach thereto a non-collusion affidavit in the form provided, to the effect that he has not colluded with any other person, firm or corporation in regard to any Bid submitted.
- 10.2 Before executing any subcontract the successful Bidder as CONTRACTOR shall submit the name of any proposed subcontractor for prior approval and an affidavit by the subcontractor in the form as that submitted by the Bidder.

11.0 NON-DISCRIMINATION STATEMENT

- 11.1 Each Bidder submitting a bid for any portion of the work contemplated by the documents on which Bidding is based shall execute and attach thereto a non-discrimination statement in the form provided, to the effect that he will follow all state and federal laws, rules, and provisions on non-discrimination.

13.0 UNIT PRICE AND LUMP SUM

- 13.1 LUMP SUM bid items shall have one cost associated for all work that is described and shown in ALL contract documents relating to that bid item.

Where applicable, the unit price for each of the items of the Bid of each Bidder shall include its pro rata share of overhead and profit obtained by multiplying the quantity shown for each

item by the unit price Bid represents the total Bid. Any Bid not conforming to this requirement may be rejected as informal.

13.2 Unbalanced Bids may be rejected. Where prices in the bid are unrealistic to the reasonably estimated cost of performing the work, Bids may be considered as informal and may be rejected.

13.3 The Owner reserves the right to negotiate any and all unit prices bid.

14.0 BID FORM

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

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

14.3 Bids must be legible, contain no omissions, alterations or additions.

14.4 Bids must contain both numerical figures and words. In event, of a discrepancy between the numerical figures and words, the words supersede the numerical figures in determining the unit bid price.

14.4 Bids by corporations must be executed in the corporate name by the President or a Vice-President (or other corporate officer, accompanied by evidence of authority to sign) and the corporate seal must be affixed and attested by the Secretary or an Assistant Secretary. The corporate address and state of incorporation must be shown below the signature.

14.4 Bids by partnership must be executed in partnership name and signed by a partner, whose title must appear under the signature and the official address of the partnership must be shown below the signature.

14.5 All names must be typed or printed below the signature.

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

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

15.0 SUBMISSION OF BIDS

Bids shall be submitted at the time and placed indicated in the Advertisement for Bids and shall be enclosed in an opaque sealed envelope, marked with the contract title, and name and address of the Bidder and accompanied by the Bid security and all other completed bid forms. If the Bid is sent through the mail or other delivery system the sealed envelope shall be enclosed in a separate envelope with notation "BID ENCLOSED" on the face of it.

16.0 MODIFICATION AND WITHDRAWAL OF BIDS

- 16.1 Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.
- 16.2 If, within twenty-four hours after Bids are opened, any Bidder files a duly signed, written notice with OWNER and promptly thereafter demonstrates to the reasonable satisfaction of OWNER that there was a material and substantial mistake in the preparation of the bid, that Bidder may withdraw its Bid and the Bid security will be returned. Thereafter, that Bidder will be disqualified from further bidding on the work to be provided under the Contract Documents.

17.0 OPENING OF BIDS

Bid will be opened and (unless obviously non-responsive) read aloud publicly. An abstract of the amounts of the Bids will be made available to Bidders after the opening of Bids.

18.0 BIDS TO REMAIN SUBJECT TO ACCEPTANCE

All bids will remain subject to acceptance for forty-five (45) days after the day of the Bid opening, but OWNER may, in its sole discretion, release any Bid and return the Bid security prior to that date.

19.0 EVALUTATION OF BIDS AND AWARD OF CONTRACT

- 19.1 OWNER reserves the right to reject any and all Bids, to waive any and all informalities not involving price, time or changes in the work and to negotiate contract terms with the Successful Bidder, and the right to disregard all non-conforming, non-responsive, unbalanced or conditional Bids. Also, OWNER reserves the right to reject the Bid of any Bidder, whether because the Bid is not responsive or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by OWNER. Discrepancies in the multiplication of units of work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.
- 19.2 In evaluating Bids, OWNER will consider the qualification of the Bidders, whether or not the Bids comply with the prescribed requirements, and such alternatives, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.

If the contract is to be awarded, it will be awarded to the lowest, responsive, responsible Bidder whose evaluation by OWNER indicates to OWNER that the award will be in the best interest of the Project. Subject to the preceding conditions, the Contract will be awarded to the lowest total Bid. Where additive bid items are indicated, Bids will be compared on the basis of the base bid price, or base bid price plus the bid price of additive bid items selected by the OWNER. It shall be understood that the OWNER may select any combination of additive bid items.

- 19.3 If the contract is to be awarded, OWNER will give the Successful Bidder a Notice of Award within forty-five (45) days after the day of the Bid opening.
- 19.4 The Statement of Surety's intent, proof of availability of insurance and preliminary M/WBE plan must be submitted by the CONTRACTOR. These must be submitted after notifying the apparent low bidder, or can be submitted with the bid.

CONTRACTOR can not be paid without an MWBE plan approved by the funding agency.

20.0 CONTRACT SECURITY

Paragraphs 5.01 and 5.02 of the General Conditions and the Supplementary Conditions set forth OWNER's requirements as to performance and payment bonds. When the Successful Bidder delivers the executed Agreement to OWNER, it must be accompanied by the required performance and payment bonds or other form of financial surety acceptable to the OWNER. All bonds must have Power-of-Attorney certifications.

OWNER requires a two (2) year warranty bond for 25% of the project cost to release retainage.

21.0 SIGNING OF AGREEMENT

When OWNER gives a Notice of Intent to Award to the Successful Bidder, it will be accompanied by the required number of unsigned counterparts of the Agreement with all other written Contract Documents attached. Within fifteen days thereafter CONTRACTOR shall sign and deliver required number of counterparts of the Agreement and attached documents to OWNER with required Bonds.

Within ten days thereafter OWNER shall deliver one fully signed counterpart to CONTRACTOR. Each counterpart is to be accompanied by a complete set of the Drawings with appropriate identification.

22.0 SALES AND USE TAXES

OWNER is exempt from New York State Sales and Use Taxes on materials and equipment to be incorporated in the work. Said taxes shall not be included in the Contract Price.

23.0 MISCELLANEOUS

- 23.1 New York State Department of Labor wage rates (Exhibit A.)
- 23.3 The contract will not allow cost increase due to inflation.

END OF SECTION

Bid Forms

1. Bid Form - Proposal
2. Bid Bond
3. Statement of Bidder's Qualifications
4. Non-Collusion Affidavit of Bidder
5. Certificate as to Corporate Principal
6. Non-Discrimination Statement
7. EEO Policy Statement
8. Lobbying Certification Form
9. AIS Certification

PROPOSAL

Date: _____

Proposal of (*company name*) _____ to furnish and deliver all material and do and perform all work in accordance with the Specifications, Drawings, and Contract Documents titled Saw Mill Pump Station Upgrades Project for the **Village/Town of Mount Kisco**.

To: Village/Town of Mount Kisco
104 Main Street
Mount Kisco, New York, 10549

The undersigned bidder has carefully examined the site of the work, is familiar with existing conditions, and has carefully examined the Plans, Specifications, Contract Documents, and Addenda covering the pump station rehabilitation and associated construction. The Contractor shall provide all necessary insurance, bonds, machinery, tools, apparatus, falsework and other means of construction, and do all the work and furnish all the materials called for by said contract according to the following unit prices. The unit price is to be shown in both words and figures. In the event of discrepancies, the amount shown in words shall govern. Bids must be legible, contain no omissions, alterations, or additions. All items are to be furnished and installed in place complete.

The undersigned further understands that the contract will be awarded to the competent, qualified bidder submitting the lowest bid for the Total Base Bid selected by the Owner.

ADDENDA ACKNOWLEDGMENT

ADDENDUM NUMBER	DATE RECEIVED

1. The undersigned Bidder, having familiarized oneself with the complete Contract Documents (plans, specifications), and all matters affecting the cost of the Work, hereby proposes to complete all Work as specified or indicated in Section 01010: "Summary of Work" of the Contract Documents for the following price:

Village/Town of Mount Kisco - Saw Mill Pump Station Upgrade Project

Contract #2021-05 - General Construction

BID ITEM					QUANTITY		UNITS	WRITE OUT THE UNIT PRICE / FIGURES		ITEM BID PRICE
GENERAL CONSTRUCTION										
G. 1		Mobilization & General Construction	1	LS						
G. 2		Pump System Modificationbs	1	LS						
G. 3		Grinder Systems	1	LS						
G. 4		Building Rehab	1	LS						
G. 5		Pump Station Control System	1	LS						
		ELECTRICAL CONSTRUCTION								
E. 1		General Electrical	1	LS						
E. 2		New Electrical Gear	1	LS						
E. 3		Grinder Electrical	1	LS						
E. 4		Pump Electrical	1	LS						
E. 5		Wetwell Blower Electrical	1	LS						
E. 6		Check Valve Electrical	1	LS						
E. 7		Instrumentation Conduit and Conductors	1	LS						
E. 8		Pump Controls Electrical	1	LS						
E. 9		New Generator	1	LS						
E. 10		New Electrical Service	1	LS						

Village/Town of Mount Kisco - Saw Mill Pump Station Upgrade Project

Contract #2021-05 - General Construction

BID ITEM				QUANTITY	UNITS	WRITE OUT THE UNIT PRICE / FIGURES		ITEM BID PRICE
E. 11		Lighting		1	LS			
		HVAC CONSTRUCTION						
H. 1		HVAC Construction at the Saw Mill PS		1	LS			
		PLUMBING CONSTRUCTION						
P. 1		Plumbing Construction at the Saw Mill PS		1	LS			
		Allowance For Owner Requested Modifications				Two Hundred Thousand Dollars and no cents	\$200,000.00	\$200,000.00
CONTRACT #2021-05 BID TOTAL COST = (write out both in words and figures)								

The undersigned also agrees as follows:

1. The total contract price bid shall be accepted as full compensation for the complete work subject to additions or deductions in quantity of work performed or changes agreed upon.
2. Within ten (10) days from the date of "Notice of Acceptance" of the Proposal, to execute the contract and to furnish a satisfactory labor, payment and performance bond in the amount of 100% of the contract price.
3. To begin work no later than ten (10) days after receipt of "Notice to Proceed" of the Owner.
4. To comply with requirements as to the conditions of employment, wage rates and hours set forth in the bidding documents.
5. The Work will be substantially complete and operational within 350 calendar days after the date the Contract Time commences to run and completed and ready for final payment within 30 days after Substantial Completion.

Accompanying this proposal is a Certified Check or Bid Bond in the amount of _____

(\$_____) payable to **Village/Town of Mount Kisco** which is forfeited as liquidated damages if this proposal is accepted and the undersigned shall fail to execute the contract and furnish satisfactory contract bond under the conditions and within the time specified in the proposal, otherwise bid security will be returned to the undersigned.

Bidder _____

By: _____ **Date:** _____

Address: _____

Phone: _____

CORPORATE SEAL

Subscribed and sworn to before me this

_____ day of _____, 20 _____

Title

My Commission Expires: _____

Date

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned _____
as PRINCIPAL, and _____, as SURETY, are held and firmly bound unto
Village/Town of Mount Kisco, New York, in the sum of
_____ Dollars (\$ _____), lawful money of
the United States for the payment of which sum well and truly to be made, we bind ourselves,
our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by
these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has submitted the
Accompanying Bid, dated _____, 20__ for _____.

NOW THEREFORE, if the Principal shall not withdraw said Bid within the period specified therein
after the opening of the same, or, if no period be specified within forty-five (45) days after the said
opening, and shall within the period specified therefore, or if no period by specified, within ninety
(90) days after the prescribed forms are presented to him for signature, enter into a written Contract
with the Village/Town of Mount Kisco, in accordance with the Bid is accepted, and give bond with
good and sufficient surety or sureties, as may be required, for the faithful performance and proper
fulfillment of such Contract; or in the event of withdrawal of said Bid within the period specified, or
the failure to enter into such Contract and give such bond within the time specified, if the Principal
shall pay the Village/Town of Mount Kisco, New York, the difference between the amount specified
in said Bid and the amount for which the Village/Town of Mount Kisco, New York, may procure the
required work or supplies or both, if the latter be in excess of the former, then the above obligation
shall be void and of no effect, otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bound parties have executed this instrument under their
several seals this _____ day of _____, 20__ the name and corporate seal of each
corporate party being hereto affixed and these presents signed by its undersigned representative,
pursuant to authority of its governing body.

No Extension of time or other modification of this Bid Bond shall be valid unless agreed to in
writing by the parties to this Bond. Signed and Sealed this _____ day of _____, 20__.

FOR BIDDER:

	(Company)	
(Witness)	(Name/Title)	(Seal)
	(Signature)	

FOR SURETY:

	(Company)	
(Witness)	(Name/Title)	(Seal)
	(Signature)	

ACKNOWLEDGEMENT FOR CORPORATION State of _____, County of _____

On this _____ day of _____, 20____, before me personally came _____

to me known, who being duly sworn, did depose and state that he is the _____ of

_____, the Corporation described in and which executed the above instrument; that he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation, and that he signed his name thereto by like order.

My commission expires: _____
Notary Public - Seal

ACKNOWLEDGEMENT FOR INDIVIDUAL: State of _____, County of _____

On this _____ day of _____, 20____, before me personally came _____

_____, to me known, and known by me to be the individual described in and who executed the foregoing instrument, and acknowledged to me that he executed the same.

My commission expires: _____
Notary Public - Seal

ACKNOWLEDGEMENT FOR FIRM: State of _____, County of _____

On this _____ day of _____, 20____, before me personally came _____

_____, to me known, and known by me to be a member of the firm of _____, described in and who executed the foregoing instrument, and he thereupon acknowledged that he executed the same as and for the act and deed of said firm.

My commission expires: _____
Notary Public - Seal

ACKNOWLEDGEMENT FOR SURETY State of _____, County of _____

On this _____ day of _____, 20____, before me personally came _____

to me known, who being duly sworn, did depose and state that he is an Attorney-In-Fact of _____ the corporation described in and which executed the within instrument; that he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal, and that he signed the said instrument and affixed the said seal as Attorney-in-Fact by authority of the Board of Directors of said corporation and by authority of this office under the Standing Resolutions thereof.

My commission expires: _____
Notary Public - Seal

Note: *Attorney-in-Fact, State of _____
Attach Power of Attorney for person signing for Surety Bond.*

STATEMENT OF BIDDER'S QUALIFICATIONS

All questions must be answered and the data given must be clear and comprehensive. This statement must be notarized. If necessary, questions may be answered on separate attached sheets. The Bidder may submit any additional information he desires.

1. Name of Bidder and permanent main office address and telephone number.
2. Names of all officers and principals in the firm.
3. When organized (Month, Day, Year).
4. If a corporation, where incorporated (City, State).
5. How many years have you been engaged in construction under your present firm or trade name?
6. Contracts on hand: (Schedule these, showing gross amount of each contract and the appropriate dates of completion).
7. General character of work performed by your company (e.g. Construction, Excavation, etc.).
8. Have you ever failed to complete any work awarded to you? If so, where and why?
9. Have you ever defaulted on a contract? If so, where and why?
10. List the important contracts completed by you within the past two years, stating approximate gross cost for each, and the month and year completed.
11. List your major equipment available for this (Description, Age, Contract, etc.).
12. List experience in construction work similar in importance to this project (Contracts within the past five years).
13. List background and experience of the principal members of your organization including the officers (Type of work, number of years).
14. Give bank reference and names in which accounts are held.
15. List on a separate sheet of paper proposed suppliers and subcontractors.
16. Will you, upon request, furnish any other information, financial or otherwise, that may be required by the OWNER?

Yes _____ No _____
17. The undersigned hereby authorizes and requests any person, firm or corporation to furnish any information requested by the OWNER verification of the recitals comprising this Statement of Bidder's Qualifications.

Dated at _____ this _____ day of _____, 20____.

(Name of Bidder)

By: _____
(Principal)

Title: _____

State of _____)
County of _____)

_____, being duly sworn, deposes and says that he is
_____ of _____
and that the answers to the foregoing questions and all statements therein contained are true and correct.

Subscribed and sworn to before me

this _____ day of _____, 20____

Notary Public

My Commission expires _____

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the (1) _____ of the Corporation named as Principal in the bid bond; that _____ who signed the said bond on behalf of the Principal was then _____ of said corporation; that I know his signature thereto is genuine; and that said bond was duly signed, and attested to for and in behalf of said corporation by authority of this governing body.

_____(Corporate Seal)
Title

NON-COLLUSION AFFIDAVIT OF BIDDER

State of _____)
)ss.
County of _____)

_____, being first duly sworn, deposes and says that:

- (1) He is (owner, partner, officer, representative, or agent) of _____, the Bidder that has submitted the attached Bid;
- (2) He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;
- (3) Such Bid is genuine and is not a collusive or sham Bid;
- (4) a. 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 his knowledge and belief:
 1. The prices in this Bid, have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;
 2. Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the Bidder and will not knowingly be disclosed by the Bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and
 3. No attempt has been made or will be made by the Bidder to induce any other person, partnership or corporation to submit or not to submit a Bid for the purpose of restricting competition.
- b. A Bid shall not be considered for award nor shall any award be made where clauses (4)a, 1, 2 and 3 above have not been complied with; provided however, that if in any case the Bidder cannot make the foregoing certification, the Bidder shall so state and shall furnish with the Bid a signed statement which sets forth in detail the reasons therefore. Where (4) a, 1, 2 and 3 above have not been complied with, the Bid shall not be considered for award nor shall any award be made unless the head of the purchasing unit of the state, public department or agency to which the Bid is made, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

The fact that a Bidder (i) has published price lists, rates, or tariffs covering items being procured, (ii) has informed prospective customers of proposed or pending publication of new or revised price lists

for such items, or (iii) has sold the same items to other customers at the same prices being bid, does not constitute, without more, a disclosure within the meaning of clause (4) a, 2.

Any Bid hereafter made to the Municipality or any public department, agency or official thereof by a corporate Bidder for work or services performed or to be performed or goods sold or to be sold, where competitive bidding is required by statute, rule or regulation, and where such Bid contains the certification referred to in subparagraph (4) a, of this section, shall be deemed to have been authorized by the Board of Directors of the Bidder and such authorization shall be deemed to include the signing and submission of the Bid and the inclusion therein of the certificate as to non-collusion as the act and deed of the corporation.

- (5) The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affidavit.

Signed: _____

Title: _____

Subscribed and sworn to before me this ____ day of _____, 20__.

Notary Public

My Commission expires _____

NON-DISCRIMINATION STATEMENT

In accordance with Article 15 of the Executive Law (also known as the Human Rights Law) and all other State and Federal statutory and constitutional non-discrimination provisions, the Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, sex, national origin, age, disability or marital status.

To the extent that such services are to be provided pursuant to the contract, the following paragraph is required:

Furthermore, in accordance with Section 220-e of the Labor Law, if this is a contract for the construction, alteration or repair of any public building or public work or for the manufacture, sale or distribution of materials, equipment or supplies, and to the extent that this contract shall be performed within the state of New York, Contractor agrees that neither it nor its subcontractors shall, by reason of race, creed, color, disability, sex or national origin: a) discriminate in hiring against any New York State citizen who is qualified and available to perform the work: b) discriminate against or intimidate any employee hired for the performance of work under this contract.

Signature: _____

Title: _____

**AGREEMENT TO ABIDE BY EQUAL EMPLOYMENT OPPORTUNITY
POLICY STATEMENT REQUIREMENTS
NEW YORK STATE REVOLVING FUND (SRF)**

I, _____, am the authorized representative of _____.

Name of Representative

Name of Contractor/Service Provider

I hereby certify that _____ will abide by the equal employment

Name of Contractor/Service Provider

opportunity (EEO) policy statement provisions outlined below.

- (i) A statement that the contractor will not discriminate on the basis of race, creed, color, national origin, sex, age, disability, or marital status against any employee or applicant for employment, will undertake or continue existing programs of affirmative action to ensure that minority group members and women are afforded equal employment opportunities without discrimination and will make and document its conscientious and active efforts to employ and utilize minority group members and women in its work force on contracts relating to the Project.
- (ii) An agreement that all of contractor's solicitations or advertisements for employees will state that, in the performance of the contract relating to this Project, all qualified applicants will be afforded equal employment opportunities without discrimination on the basis of race, creed, color, national origin, sex, age, disability or marital status.
- (iii) An agreement to request each employment agency, labor union, or authorized representative of workers with which it has a collective bargaining or other agreement or understanding, to furnish a written statement that such employment agency, labor union, or representative will not discriminate on the basis of race, creed, color, national origin, sex, age, disability or marital status and that such union or representative will affirmatively cooperate in the implementation of the contractor's obligations herein.
- (iv) An agreement to comply with the provisions of the Human Rights Law (Article 15 of the Executive Law), including those relating to non-discrimination on the basis of prior criminal conviction and prior arrest, and with all other State and federal statutory constitutional non-discrimination provisions.

Blank EEO Policy Statements are available at www.efc.ny.gov/mwbe, if needed.

If contractor fails to submit to Recipient an EEO policy statement consistent with the provisions set forth above in clauses (i), (ii), (iii) and (iv) and within the timeframe required thereof, Recipient may declare this contract to be null and void.

X

Contractor/Service Provider Representative

Once completed, please provide to the Prime Contractor and/or the community MBO

**CERTIFICATION
FOR
CONTRACTS, GRANTS, LOANS, AND
COOPERATIVE AGREEMENTS
40 CFR 34**

SRF Project No.: _____

The undersigned each certify, to the best of his or her knowledge and belief, that:

- (1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- (2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- (3) The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including sub-contracts, sub-grants, and contracts under grant, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31 U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

By: _____

Name:

Title:

Date: _____

Contract ID: _____

Attachment 10
New York State Environmental Facilities Corporation
Contractor's American Iron and Steel (AIS) Certifications

To be completed by prime contractors for all construction contracts

AIS CONTRACTOR CERTIFICATION
FOR CONSTRUCTION CONTRACTS PAID FOR WITH FUNDS FROM
THE NYS CLEAN WATER STATE REVOLVING FUND OR
THE NYS DRINKING WATER STATE REVOLVING FUND VIA THE
NYS ENVIRONMENTAL FACILITIES CORPORATION

Project Title: _____

Contractor's Name: _____

Contract ID: _____

SRF Project #: _____

SRF Recipient Name: _____

I certify that the iron and steel products that will be permanently incorporated into the public water system or wastewater treatment works project under this construction contract will have been produced in the United States, in accordance with the requirements of the US Environmental Protection Agency. I will also develop and maintain at the project location the necessary documentation to demonstrate that the iron and steel products incorporated into the project were produced in the United States, and make such documentation available to The NYS Environmental Facilities Corporation or their authorized representatives, upon request.

Signature: _____

Name (print): _____

Title: _____

Date: _____

Attachment 11
New York State Environmental Facilities Corporation
Manufacturer's American Iron and Steel (AIS) Certifications

1. The following information is provided as a manufacturer's sample letter of **step** certification for AIS compliance. Documentation must be provided on company letterhead.

Date

Company Name

Company Address

City, State Zip

Subject: American Iron and Steel Step Certification for Project (XXXXXXXXXX)

I, (company representative), certify that the (melting, bending, coating, galvanizing, cutting, etc.) process for (manufacturing or fabricating) the following products and/or materials shipped or provided for the subject project is in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

Item, Products and/or Materials:

1. Xxx

2. Xxx

3. Xxx

Such process took place at the following location: _____

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

[Signed by company representative]

Attachment 11
New York State Environmental Facilities Corporation
Manufacturer's American Iron and Steel (AIS) Certifications

2. The following information is provided as a manufacturer's sample letter of certification for AIS compliance. Documentation must be provided on company letterhead.

Date

Company Name

Company Address

City, State Zip

Subject: American Iron and Steel Certification for Project (XXXXXXXXXX)

I, (company representative), certify that the following products and/or materials shipped/provided to the subject project are in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

Item, Products and/or Materials:

1. Xxx

2. Xxx

3. Xxx

Such process took place at the following location: _____

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

[Signed by company representative]

Notice of Award

NOTICE OF AWARD

Date of Issuance:

Owner:

Owner's Project No.:

Engineer:

Engineer's Project No.:

Project:

Contract Name:

Bidder:

Bidder's Address:

You are notified that Owner has accepted your Bid dated **[date]** for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

[Describe Work, alternates, or sections of Work awarded]

The Contract Price of the awarded Contract is \$**[Contract Price]**. Contract Price is subject to adjustment based on the provisions of the Contract.

[Number of copies sent] unexecuted counterparts of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award, or has been transmitted or made available to Bidder electronically.

☐ Drawings will be delivered separately from the other Contract Documents.

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to Owner **[number of copies sent]** counterparts of the Agreement, signed by Bidder (as Contractor).
2. Deliver with the signed Agreement(s) the Contract security (such as required performance and payment bonds) and insurance documentation, as specified in the Instructions to Bidders and in the General Conditions, Articles 2 and 6.
3. Other conditions precedent (if any): **[Describe other conditions that require Successful Bidder's compliance]**

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

Within 10 days after you comply with the above conditions, Owner will return to you one fully signed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner: **[Full formal name of Owner]**

By *(signature)*: _____

Name *(printed)*: _____

Title: _____

Copy: Engineer

Standard Form of Agreement

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

Article 1. PARTIES TO CONTRACT.

THIS AGREEMENT is dated as of the _____ day of _____ in the year 20 _____ by and between the Village/Town of Mount Kisco (hereinafter called OWNER) and _____
(hereinafter called CONTRACTOR).

OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

Article 2. WORK.

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

Saw Mill Pump Station Upgrades

Article 3. CONTRACT TIMES.

- 3.1 The Work will be substantially complete and operational within 350 calendar days after the date the Contract Time commences to run and completed and ready for final payment within 30 days after Substantial Completion.
- 3.2 *Liquidated Damages.* OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the Work is not completed within the times specified in paragraph 3.1 above, plus any extensions thereof allowed in accordance with Article 12.02 of the General Conditions. They also recognize the delays, expense and difficulties involved in proving the actual loss suffered by OWNER if the Work is not completed on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay OWNER One Thousand and 00/100 dollars (\$ 1,000.00) for each day that expires after the time specified in paragraph 3.1 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if CONTRACTOR shall neglect, refuse or fail to complete the remaining Work within the time specified in paragraph 3.1 for completion and readiness for final payment or any proper extension thereof granted by OWNER. CONTRACTOR shall pay OWNER One Thousand and 00/100 dollars (\$1,000.00) for each day that expires after the time specified in paragraph 3.1 for completion and readiness for final payment.
- 3.3 In addition to the liquidated damages set forth above, the CONTRACTOR shall be liable for all additional costs incurred by the OWNER for engineering and inspection services that extends beyond the substantial completion time specified in the Contract Documents.

Article 4. CONTRACT PRICE.

The total estimated amount of the Contract is _____
(\$ _____) based on the prices set forth in the Bid Form.

OWNER shall pay CONTRACTOR for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to paragraphs 4.1 and 4.2 below:

- 4.1. For all Unit Price Work, an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the estimated quantity of that item as indicated in this paragraph 4.1
- 4.2. As provided in paragraph 13.03 of the General Conditions estimated quantities are not guaranteed, and determinations of actual quantities and classification are to be made by ENGINEER as provided in paragraph 10.07 of the General Conditions. Unit prices have been computed as provided in paragraph 11.03 of the General Conditions.

Article 5. PAYMENT PROCEDURES.

CONTRACTOR shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by ENGINEER as provided in the General Conditions.

- 5.1. *Progress Payment & Retainage.* OWNER shall make progress payments on account of the Contract Price on the basis of CONTRACTOR's Applications for Payment as recommended by ENGINEER, on or about the last day of each month during construction as provided in paragraphs 5.1.1 and 5.1.2 below. All such payments will be measured by the schedule of values established in paragraph 2.03 of the General Conditions (and in the case of Unit Price Work based on the number of units completed or, in the event there is no schedule of values, as provided in the General Requirements.
 - 5.1.1 Prior to substantial completion, the CONTRACTOR shall be paid up to 95% of the amount for the work completed in accordance with Section 11 of Special Conditions, with the 5% balance being retainage.
 - 5.1.2. Upon Substantial Completion, the OWNER may increase total payments to CONTRACTOR to 100% of Contract Price, less an amount equal to double the value of the remaining work or the retainage which ever is less, provided the OWNER receives a release of surety from the CONTRACTOR.
 - 5.1.3. Before the OWNER releases retainage, the CONTRACTOR must provide a 2-year 25% Warranty Bond.
- 5.2. *Final Payment.* Upon final completion and acceptance of the Work in accordance with paragraph 15.06 of the General Conditions. OWNER shall pay the remainder of the Contract Price.
- 5.3. *Change Orders.* For changes in work greater than \$100,000, the percentage of overhead and profit shall be subject to negotiation.

Article 6. CONTRACTOR'S REPRESENTATIONS.

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

- 6.1 CONTRACTOR has examined and carefully studied the Contract Documents (including the Addenda) and the other related data identified in the Bidding Documents including "technical data."
- 6.2 CONTRACTOR has visited the site and become familiar with and is satisfied as to the general, local and site conditions that may affect cost, progress, performance or furnishing of the Work.
- 6.3 CONTRACTOR is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress, performance and furnishing of the Work.
- 6.4 CONTRACTOR has obtained and carefully studied (or assumes responsibility for having done so) all such additional supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by CONTRACTOR and safety precautions and programs incident thereto. CONTRACTOR does not consider that any additional examinations, investigation, explorations, tests, studies or data are necessary for the performance and furnishing of the Work at the Contract Price, within the Contract Times and in accordance with the other terms and conditions of the Contract Documents.
- 6.5 CONTRACTOR is aware of the general nature of work to be performed by OWNER and others at the site that relates to the Work as indicated in the Contract Documents.
- 6.6 CONTRACTOR has correlated the information known to CONTRACTOR, information and observations obtained from visits to the site, reports and drawings identified in the Contract Documents and all additional examinations, investigations, explorations, tests, studies and data with the Contract Documents.
- 6.7 CONTRACTOR has given ENGINEER written notice of all conflicts, errors, ambiguities or discrepancies that CONTRACTOR has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR, and the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

Article 7. CONTRACT DOCUMENTS.

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

- 7.1. This Agreement
- 7.2. Exhibits to this Agreement
- 7.3. Performance, Payment, and other Bonds, identified as exhibits.
- 7.4. Notice to Proceed
- 7.5. General Conditions

- 7.6. Supplementary Conditions
- 7.7. Special Conditions
- 7.8. Specifications bearing the title Contract Specifications
- 7.9. Drawings with each sheet bearing the following general title: Saw Mill Pump Station Rehabilitation Project
- 7.10. Addenda.
- 7.11. CONTRACTOR's Bid
- 7.12. Documentation submitted by CONTRACTOR prior to Notice of Award
- 7.13. The following which may be delivered or issued after the Effective Date of the Agreement and are not attached hereto: All Written Amendments and other documents amending, modifying or supplementing the Contract Documents pursuant to paragraph 3.04 of the General Conditions.

The documents listed in paragraphs 7.2 et seq. above are attached to this Agreement (except as expressly noted otherwise above).

There are no Contract Documents other than those listed above in Article 7. The Contract Documents may only be amended, modified or supplemented as provided in paragraphs 3.04 of the General Conditions.

Article 8. MISCELLANEOUS.

- 8.1. Terms used in this Agreement which are defined in Article 1 of the General Conditions will have the meanings indicated in the General Conditions.
- 8.2. No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment. No assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.
- 8.3. OWNER and CONTRACTOR each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.
- 8.4. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon OWNER and CONTRACTOR, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

Article 9. Affirmative Action Provisions

- 9.1. Refer to Supplementary Conditions Article 8, paragraph H for the affirmative action goals.

Article 10. Contractor's Agreement Certification

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

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

OWNER _____ CONTRACTOR _____

By: _____ By: _____

[CORPORATE SEAL]

[CORPORATE SEAL]

Performance Bond

PERFORMANCE BOND

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

CONTRACTOR *(Name and Address):* SURETY *(Name, and Address of Principal Place of Business):*

OWNER *(Name and Address):*

CONTRACT
Effective Date of Agreement:
Amount:
Description *(Name and Location):*

BOND
Bond Number:
Date *(Not earlier than Effective Date of Agreement):*
Amount:
Modifications to this Bond Form:

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

CONTRACTOR AS PRINCIPAL	SURETY
_____ Contractor's Name and Corporate Seal	_____ Surety's Name and Corporate Seal
By: _____ Signature	By: _____ Signature (Attach Power of Attorney)
_____ Print Name	_____ Print Name
_____ Title	_____ Title
Attest: _____ Signature	Attest: _____ Signature
_____ Title	_____ Title

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

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

1. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 2.1.
2. If there is no Owner Default, Surety's obligation under this Bond shall arise after:
 - 2.1 Owner has notified Contractor and Surety, at the addresses described in Paragraph 9 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor, and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and
 - 2.2 Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 2.1; and
 - 2.3 Owner has agreed to pay the Balance of the Contract Price to:
 1. Surety in accordance with the terms of the Contract; or
 2. Another contractor selected pursuant to Paragraph 3.3 to perform the Contract.
3. When Owner has satisfied the conditions of Paragraph 2, Surety shall promptly, and at Surety's expense, take one of the following actions:
 - 3.1 Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or
 - 3.2 Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
 - 3.3 Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 5 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or
 - 3.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:
 1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or
 2. Deny liability in whole or in part and notify Owner citing reasons therefor.
4. If Surety does not proceed as provided in Paragraph 3 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 3.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.
5. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 3.1, 3.2, or 3.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To the limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:

- 5.1 The responsibilities of Contractor for correction of defective Work and completion of the Contract;
- 5.2 Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions of or failure to act of Surety under Paragraph 3; and
- 5.3 Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

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

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

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

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

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

11. Definitions.

- 11.1 Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.
- 11.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.
- 11.3 Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.
- 11.4 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or otherwise comply with the other terms thereof.

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

Surety Agency or Broker:

Owner's Representative *(Engineer or other party)*:

Payment Bond

PAYMENT BOND

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

CONTRACTOR (*Name and Address*):

SURETY (*Name, and Address of Principal Place of Business*):

OWNER (*Name and Address*):

CONTRACT

Effective Date of Agreement:

Amount:

Description (*Name and Location*):

BOND

Bond Number:

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

Amount:

Modifications to this Bond Form:

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

CONTRACTOR AS PRINCIPAL

SURETY

Contractor's Name and Corporate Seal

Surety's Name and Corporate Seal

By: _____
Signature

By: _____
Signature (Attach Power of Attorney)

Print Name

Print Name

Title

Title

Attest: _____
Signature

Attest: _____
Signature

Title

Title

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

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.
2. With respect to Owner, this obligation shall be null and void if Contractor:
 - 2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants, and
 - 2.2 Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.
3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.
4. Surety shall have no obligation to Claimants under this Bond until:
 - 4.1 Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.
 - 4.2 Claimants who do not have a direct contract with Contractor:
 1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and
 2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and
 3. Not having been paid within the above 30 days, have sent a written notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.
5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.
6. When a Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at Surety's expense take the following actions:
 - 6.1 Send an answer to that Claimant, with a copy to Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.
 - 6.2 Pay or arrange for payment of any undisputed amounts.
7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.
8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.

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

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

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

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

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

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

15. Definitions

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

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

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

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

Surety Agency or Broker:

Owner's Representative (*Engineer or other*):

Certificate of Insurance

Insert Insurance Certificate here

Notice to Proceed

NOTICE TO PROCEED

Owner:	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer: Delaware Engineering, D.P.C.	Engineer's Project No.:
Project:	
	Effective Date of Contract:

TO CONTRACTOR:

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on **[Month, Day, Year]**.

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work shall be done at the Site prior to such date. In accordance with the Agreement, the number of days to achieve Substantial Completion is _____, and the number of days to achieve readiness for final payment is _____.

Before starting any Work at the Site, Contractor must notify **Dig Safe New York** for an emergency callout to the site.

Note MWBE Utilization Plan must be approved prior to payment processing.

Owner:

By:
Title:
Date Issued:

Copy: **Robert Flores, PE - Delaware Engineering, DPC**

Contract Change Order

Project Name
Municipality of Name
Name County, NY
CHANGE ORDER NO. #

Owner _____ Date _____
Project _____
Owner's Contract No. _____ Contractor: _____
Date of Contract Start _____

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

Reason for Change Order:

CONTRACT PRICE		CONTRACT TIMES (Calendar Days)	
		To substantial completion	To final completion
Original:	\$ _____	ORIGINAL:	_____
Previous C.O.s (ADD):	\$ _____	Previous C.O.s (ADD/DEDUCT):	_____
This C.O. (ADD / NTE):	\$ _____	This C.O. (ADD/DEDUCT):	_____
Contract Price with all		REVISED:	_____
Approved Change Orders:	\$ _____	Notice to proceed:	_____
		Original Completion Date:	_____

Change Order Details:

THIS DOCUMENT SHALL BECOME AN AMENDMENT TO THE CONTRACT AND ALL
STIPULATIONS AND COVENANTS OF THE CONTRACT SHALL APPLY HERETO.

RECOMMENDED:

By: _____ Date _____
Engineer (Authorized Signature)

APPROVED:

By: _____ Date _____
Owner (Authorized Signature)

ACCEPTED:

By: _____ Date _____
Contractor (Authorized Signature)

Certificate of Substantial Completion

CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner:
Contractor:
Engineer: Delaware Engineering, D.P.C.
Project:

Owner's Project No.:
Contractor's Project No.:
Engineer's Project No.:
Contract Name:

This final Certificate of Substantial Completion applies to:

☐ All Work ☐ The following specified portions of the Work:

Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Work or portion thereof designated above is hereby established, subject to the provisions of the Contract pertaining to Substantial Completion. The date of Substantial Completion in the final Certificate of Substantial Completion marks the commencement of the contractual correction period and applicable warranties required by the Contract.

A punch list of items to be completed or corrected is attached to this Certificate. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance, and warranties upon Owner's use or occupancy of the Work shall be as provided in the Contract, except as amended as follows: *[Note: Amendments of contractual responsibilities recorded in this Certificate should be the product of mutual agreement of Owner and Contractor; see Paragraph 15.03.D of the General Conditions.]*

Amendments to Owner's
responsibilities: ☐ None
☐ As follows

Amendments to
Contractor's responsibilities: ☐ None
☐ As follows:

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

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

<p>EXECUTED BY ENGINEER:</p> <p>By: _____ (Authorized signature)</p> <p>Title: _____</p> <p>Date: _____</p>	<p>RECEIVED:</p> <p>By: _____ Owner (Authorized Signature)</p> <p>Title: _____</p> <p>Date: _____</p>	<p>RECEIVED:</p> <p>By: _____ Contractor (Authorized Signature)</p> <p>Title: _____</p> <p>Date: _____</p>
--	--	---

Partial Release and Waiver of Mechanic's Lien

PARTIAL RELEASE AND WAIVER OF MECHANIC'S LIEN

PROJECT NAME: _____ CONTRACTOR/SUPPLIER: _____

PROJECT ADDRESS:

CONTRACTOR/SUPPLIER'S CONTRACT
NUMBER: _____ OWNER: _____ THROUGH
PERIOD ENDING: _____
CONSTRUCTION MANAGER: _____ PARTIAL PAYMENT AMOUNT:

CONTRACTOR/SUPPLIER has provided labor, materials, rentals and/or services (collectively, "Work") on the above-described Project.

CONTRACTOR/SUPPLIER, for and in consideration of Partial Payment Amount to be paid upon execution of this Partial Release, does for itself, its successors, administrations and assigns, hereby affirm and agree as follows with respect to all Work performed to date and for which payment has been made pursuant to this Partial Release, except as noted below in Paragraph 3:

1. All labor employed in connection with the Work and the Project and all related payroll taxes and charges (such as withholding taxes, social security taxes and worker's compensation, disability and unemployment taxes and/or insurance premiums) have been paid in full, see attached; and
2. All materials, tools, equipment, supplies and services furnished and used upon or in connection with the Work and the Project have been paid for in full; and all sales, use, excise and similar taxes on or in connection with the same have been fully paid, see attached; and
3. Upon receipt by CONTRACTOR/SUPPLIER of a check from the CONSTRUCTION MANAGER in the Partial Payment Amount described above, payable to the CONTRACTOR/SUPPLIER, and when the check has been paid, this document shall become effective to release and forever discharge the CONSTRUCTION MANAGER, its surety and the OWNER and their respective officers, directors, agents, servants and employees, and all lands, improvements, chattels, and other real and personal property connected with or a part of the Project from any and all claims, demands, liens and claims of lien whatsoever, which it now has or hereafter might or could have arising out of the performance of all Work for which payment has been made.

CONTRACTOR/SUPPLIER will, at its sole cost and expense, forever hold harmless, CONSTRUCTION MANAGER, its surety and OWNER from any and all claims and demands and will defend against and obtain the discharge of any liens and claims of lien of others arising out of or in connection with the work, including, without limitation, those claimed or asserted by any employee, supplier or subcontractor of the CONTRACTOR/SUPPLIER (or any employee or supplier of any subcontractor/supplier of the undersigned), governmental agency or any insurance carrier; and

CONTRACTOR/SUPPLIER warrants that the amount of payments received or to be received represents the total value earned by CONTRACTOR/SUPPLIER for materials, labor, rentals, equipment and services supplied to the Project for the above-described contract.

CONTRACTOR/SUPPLIER warrants that it has not and will not assign any claims for payment or right to perfect a lien against such land and improvements and appurtenances and warrants that it has the right to execute this waiver and release.

This release and waiver may not be changed orally.

CONTRACTOR/SUPPLIER agrees that the CONSTRUCTION MANAGER, the OWNER of the Project, any lender, any title insurer, and any surety may rely upon this waiver and release.

IN WITNESS WHEREOF, _____, of _____ has hereunto set her/his hand
this _____ day of _____, 20__.

CONTRACTOR/SUPPLIER: _____

AUTHORIZED AGENT: _____

WITNESS: _____

SIGNATURE: _____

TITLE: _____

STATE OF NEW YORK)
) SS.:
COUNTY OF _____)

On the ____ day of _____ in the year 20__ before me, the undersigned, a Notary Public in and for said State, personally appeared _____, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

Notary Public

(Signature and office of individual taking acknowledgment.)

Warranty Bond

WARRANTY BOND

Contractor Name: _____ Address (principal place of business): _____	Surety Name: _____ Address (principal place of business): _____
Owner Name: _____ Address (principal place of business): _____	Construction Contract Description (name and location): _____ Contract Price: _____ Effective Date of Contract: _____ Contract's Date of Substantial Completion: _____
Bond Bond Amount: _____ Date of Bond: _____ Modifications to this Bond form: <input type="checkbox"/> None <input type="checkbox"/> See Paragraph 9	
Bond Period: Commencing at Substantial Completion of the Work under the Construction Contract and continuing until two (2) years after such Substantial Completion. This does not shorten or in any way limit a manufacturer's Warranty.	
Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth herein, do each cause this Warranty Bond to be duly executed by an authorized officer, agent, or representative.	
Contractor as Principal	Surety
_____ <i>(Full formal name of Contractor)</i>	_____ <i>(Full formal name of Surety) (corporate seal)</i>
By: _____ <div style="text-align: center;"><i>(Signature)</i></div>	By: _____ <div style="text-align: center;"><i>(Signature) (Attach Power of Attorney)</i></div>
Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>	Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>
Title: _____	Title: _____
Attest: _____ <div style="text-align: center;"><i>(Signature)</i></div>	Attest: _____ <div style="text-align: center;"><i>(Signature)</i></div>
Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>	Name: _____ <div style="text-align: center;"><i>(Printed or typed)</i></div>
Title: _____	Title: _____
<i>Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.</i>	

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract's Correction Period Obligations. The Construction Contract is incorporated herein by reference.
2. If the Contractor performs the Correction Period Obligations, the Surety and the Contractor shall have no obligation under this Warranty Bond.
3. If Owner gives written notice to Contractor and Surety during the Bond Period of Contractor's obligation under the Correction Period Obligations, and Contractor does not fulfill such obligation, then Surety shall be responsible for fulfillment of such Correction Period Obligations. Surety shall either fulfill the Correction Period Obligations itself, through its agents or contractors, or, in the alternative, Surety may waive the right to fulfill the Correction Period Obligations itself, and reimburse the Owner for all resulting costs incurred by Owner in performing Contractor's Correction Period Obligations, including but not limited to correction, removal, replacement, and repair costs.
4. The Surety's liability is limited to the amount of this Warranty Bond. Renewal or continuation of the Warranty Bond will not modify such amount, unless expressly agreed to by Surety in writing.
5. The Surety shall have no liability under this Warranty Bond for obligations of the Contractor that are unrelated to the Construction Contract. No right of action will accrue on this Warranty Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.
6. Any proceeding, legal or equitable, under this Warranty Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and must be instituted within two years after the Surety refuses or fails to perform its obligations under this Warranty Bond.
7. Written notice to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown in this Warranty Bond.
8. Definitions
 - 8.1. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page of this Warranty Bond, including all Contract Documents and changes made to the agreement and the Contract Documents.
 - 8.2. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
 - 8.3. *Correction Period Obligations*—The duties, responsibilities, commitments, and obligations of the Contractor with respect to correction or replacement of defective Work, as set forth in the Construction Contract's Correction Period clause, EJCDC® C-700, Standard General Conditions of the Construction Contract (2018), Paragraph 15.08, as duly modified.
 - 8.4. *Substantial Completion*—As defined in the Construction Contract.
 - 8.5. *Work*—As defined in the Construction Contract.
9. Modifications to this Bond are as follows:

General Conditions

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by



Issued and Published Jointly by



These General Conditions have been prepared for use with the Agreement Between Owner and Contractor for Construction Contract (EJCDC® C-520, Stipulated Sum, or C-525, Cost-Plus, 2013 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other.

To prepare supplementary conditions that are coordinated with the General Conditions, use EJCDC's Guide to the Preparation of Supplementary Conditions (EJCDC® C-800, 2013 Edition). The full EJCDC Construction series of documents is discussed in the Commentary on the 2013 EJCDC Construction Documents (EJCDC® C-001, 2013 Edition).

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.
 3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 5. *Bidder*—An individual or entity that submits a Bid to Owner.
 6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.
 7. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.
 8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.
 9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.
 10. *Claim*—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment of Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer

has declined to address. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. (“CERCLA”); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5501 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. (“RCRA”); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.
12. *Contract*—The entire and integrated written contract between the Owner and Contractor concerning the Work.
13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.
14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents. .
15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.
16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.
17. *Cost of the Work*—See Paragraph 13.01 for definition.
18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.
19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.
20. *Engineer*—The individual or entity named as such in the Agreement.
21. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
22. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.
23. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

24. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
25. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.
26. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.
27. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.
28. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.
29. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.
30. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.
31. *Project Manual*—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.
32. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or "RPR" includes any assistants or field staff of Resident Project Representative.
33. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
34. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals and the performance of related construction activities.
35. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.
36. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

37. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by Owner which are designated for the use of Contractor.
38. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.
39. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.
40. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
41. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.
42. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
43. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.
44. *Technical Data*—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.
45. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
46. *Unit Price Work*—Work to be paid for on the basis of unit prices.
47. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

48. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

1.02 Terminology

- A. The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives:*
1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.
- C. *Day:*
1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
- D. *Defective:*
1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - a. does not conform to the Contract Documents; or
 - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).
- E. *Furnish, Install, Perform, Provide:*
1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
 2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
 4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.
- F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

- A. *Bonds*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Contractor’s Insurance*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.
- C. *Evidence of Owner’s Insurance*: After receipt of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or otherwise), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

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

2.03 *Before Starting Construction*

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

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

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Initial Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.03.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
 2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
 3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

2.06 *Electronic Transmittals*

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.
- B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or

computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents.
- C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.
- D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.
- E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

3.02 *Reference Standards*

- A. Standards Specifications, Codes, Laws and Regulations
 - 1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
 - 2. No provision of any such standard specification, manual, reference standard, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

- A. *Reporting Discrepancies:*
 - 1. *Contractor's Verification of Figures and Field Measurements:* Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict,

error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

2. *Contractor's Review of Contract Documents:* If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies:*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:
 - a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

- A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.
- B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.
- C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

- A. Contractor and its Subcontractors and Suppliers shall not:
 - 1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or
 - 2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

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

4.02 *Starting the Work*

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

4.03 *Reference Points*

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

4.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.
 - 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.
- B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

- A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
- C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:
 1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
 2. abnormal weather conditions;
 3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and
 4. acts of war or terrorism.
- D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.
- E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.
- F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.

- G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.
- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 *Use of Site and Other Areas*

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

- 1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.
- 2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part

by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

- B. *Removal of Debris During Performance of the Work:* During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.
- C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
- D. *Loading of Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

- A. *Reports and Drawings:* The Supplementary Conditions identify:
 - 1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;
 - 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and
 - 3. Technical Data contained in such reports and drawings.
- B. *Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:
 - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
 - 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
 - 3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 *Differing Subsurface or Physical Conditions*

- A. *Notice by Contractor:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site either:
1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or
 2. is of such a nature as to require a change in the Drawings or Specifications; or
 3. differs materially from that shown or indicated in the Contract Documents; or
 4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

- B. *Engineer's Review:* After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- C. *Owner's Statement to Contractor Regarding Site Condition:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.
- D. *Possible Price and Times Adjustments:*
1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. such condition must fall within any one or more of the categories described in Paragraph 5.04.A;
 - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,

- c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
 - a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or
 - b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
 - c. Contractor failed to give the written notice as required by Paragraph 5.04.A.
3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

5.05 *Underground Facilities*

- A. *Contractor's Responsibilities:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:
 1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and
 2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
 - b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;
 - c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
 - d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.
- B. *Notice by Contractor:* If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after

becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.

- C. *Engineer's Review:* Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer's findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
- D. *Owner's Statement to Contractor Regarding Underground Facility:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question, addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.
- E. *Possible Price and Times Adjustments:*
 - 1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;
 - b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;
 - c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times; and
 - d. Contractor gave the notice required in Paragraph 5.05.B.
 - 2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
 - 3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

5.06 *Hazardous Environmental Conditions at Site*

- A. *Reports and Drawings:* The Supplementary Conditions identify:
1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
 2. Technical Data contained in such reports and drawings.
- B. *Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
 3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

- F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.
- G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.
- H. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.
- I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.H shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6 – BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Contractor's obligations under the Contract. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.
- B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.
- C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.
- D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.
- E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.
- F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

6.02 *Insurance—General Provisions*

- A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions.
- B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.
- C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is

maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

- D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.
- E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.
- F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.
- G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.
- H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.
- I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.
- J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner and other individuals and entities in the Contract.

6.03 *Contractor's Insurance*

- A. *Workers' Compensation:* Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:
 - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.
 - 2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).
 - 3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).

4. Foreign voluntary worker compensation (if applicable).
- B. *Commercial General Liability—Claims Covered:* Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:
1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.
 2. claims for damages insured by reasonably available personal injury liability coverage.
 3. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.
- C. *Commercial General Liability—Form and Content:* Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:
1. Products and completed operations coverage:
 - a. Such insurance shall be maintained for three years after final payment.
 - b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.
 2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.
 3. Broad form property damage coverage.
 4. Severability of interest.
 5. Underground, explosion, and collapse coverage.
 6. Personal injury coverage.
 7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.
 8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.
- D. *Automobile liability:* Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.
- E. *Umbrella or excess liability:* Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.
- F. *Contractor's pollution liability insurance:* Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result

of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.

- G. *Additional insureds*: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions; include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.
- H. *Contractor's professional liability insurance*: If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.
- I. *General provisions*: The policies of insurance required by this Paragraph 6.03 shall:
 - 1. include at least the specific coverages provided in this Article.
 - 2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.
 - 3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.
 - 4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.
 - 5. be appropriate for the Work being performed and provide protection from claims that may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable.
- J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

6.04 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.
- B. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

6.05 *Property Insurance*

- A. *Builder's Risk:* Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:
 - 1. include the Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."
 - 2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.
 - 3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.
 - 4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).

5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).
 6. extend to cover damage or loss to insured property while in transit.
 7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
 8. allow for the waiver of the insurer's subrogation rights, as set forth below.
 9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.
 10. not include a co-insurance clause.
 11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.
 12. include performance/hot testing and start-up.
 13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.
- B. *Notice of Cancellation or Change:* All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.
- C. *Deductibles:* The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.
- D. *Partial Occupancy or Use by Owner:* If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
- E. *Additional Insurance:* If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.
- F. *Insurance of Other Property:* If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

6.06 *Waiver of Rights*

- A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for:
 - 1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
 - 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.
- D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder's risk insurance and any other property insurance applicable to the Work.

6.07 *Receipt and Application of Property Insurance Proceeds*

- A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the

policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

- B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.
- C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.
- B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and

guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

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

7.04 "Or Equals"

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.
 - 1. If Engineer in its sole discretion determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer shall deem it an "or equal" item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that:
 - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
 - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
 - 3) it has a proven record of performance and availability of responsive service; and
 - 4) it is not objectionable to Owner.
 - b. Contractor certifies that, if approved and incorporated into the Work:
 - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.
- B. *Contractor's Expense:* Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.
- C. *Engineer's Evaluation and Determination:* Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal", which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

- D. *Effect of Engineer's Determination:* Neither approval nor denial of an "or-equal" request shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.
- E. *Treatment as a Substitution Request:* If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the proposed item as a substitute pursuant to Paragraph 7.05.

7.05 Substitutes

- A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.
 - 1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.
 - 2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.
 - 3. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
 - a. shall certify that the proposed substitute item will:
 - 1) perform adequately the functions and achieve the results called for by the general design,
 - 2) be similar in substance to that specified, and
 - 3) be suited to the same use as that specified.
 - b. will state:
 - 1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,
 - 2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and
 - 3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.
 - c. will identify:
 - 1) all variations of the proposed substitute item from that specified, and

- 2) available engineering, sales, maintenance, repair, and replacement services.
- d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.
- B. *Engineer's Evaluation and Determination:* Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.
- C. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- D. *Reimbursement of Engineer's Cost:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- E. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute at Contractor's expense.
- F. *Effect of Engineer's Determination:* If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

7.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.
- B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.
- C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.
- D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.

- E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.
- F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.
- G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.
- H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions.
- J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.
- K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.
- L. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.
- N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.

O. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor
2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

7.07 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.08 *Permits*

- A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work

7.09 *Taxes*

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

7.10 *Laws and Regulations*

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

7.11 *Record Documents*

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

7.12 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:
 - 1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.
 - C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.
 - D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
 - E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
 - F. Contractor's duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).
 - G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.13 *Safety Representative*

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

7.14 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or

exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 *Emergencies*

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

7.16 *Shop Drawings, Samples, and Other Submittals*

A. *Shop Drawing and Sample Submittal Requirements:*

1. Before submitting a Shop Drawing or Sample, Contractor shall have:
 - a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
 - c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.
2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that submittal, and that Contractor approves the submittal.
3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

- B. *Submittal Procedures for Shop Drawings and Samples:* Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.

1. *Shop Drawings:*

- a. Contractor shall submit the number of copies required in the Specifications.
- b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to

provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.

2. *Samples:*

- a. Contractor shall submit the number of Samples required in the Specifications.
- b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.

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

C. *Other Submittals:* Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.

D. *Engineer's Review:*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.
3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
4. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.
5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.
6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.
7. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.

8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.

E. *Resubmittal Procedures:*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.
2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.
3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

7.17 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
 1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 2. normal wear and tear under normal usage.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
 1. observations by Engineer;
 2. recommendation by Engineer or payment by Owner of any progress or final payment;
 3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 4. use or occupancy of the Work or any part thereof by Owner;
 5. any review and approval of a Shop Drawing or Sample submittal;
 6. the issuance of a notice of acceptability by Engineer;
 7. any inspection, test, or approval by others; or
 8. any correction of defective Work by Owner.

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

7.18 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.
- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- C. The indemnification obligations of Contractor under Paragraph 7.18.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:
 - 1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
 - 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

7.19 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.
- B. If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop

Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this paragraph, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 *Other Work*

- A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.
- B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.
- D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

8.02 *Coordination*

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

8.03 *Legal Relationships*

- A. If, in the course of performing other work at or adjacent to the Site for Owner, the Owner's employees, any other contractor working for Owner, or any utility owner causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract. When applicable, any such equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.
- C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.

- D. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9 – OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

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

9.02 *Replacement of Engineer*

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

9.03 *Furnish Data*

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

9.04 *Pay When Due*

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

9.05 *Lands and Easements; Reports, Tests, and Drawings*

- A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.
- B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
- C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

- A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *Limitations on Owner's Responsibilities*

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

9.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.
- B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

- A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract.

10.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.
- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during

or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Project Representative*

- A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 10.08. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent, or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

10.04 *Rejecting Defective Work*

- A. Engineer has the authority to reject Work in accordance with Article 14.

10.05 *Shop Drawings, Change Orders and Payments*

- A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.
- B. Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.
- C. Engineer's authority as to Change Orders is set forth in Article 11.
- D. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.06 *Determinations for Unit Price Work*

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

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

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

10.08 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 15.06.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the Resident Project Representative, if any.

10.09 *Compliance with Safety Program*

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

ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

11.01 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
 - 1. *Change Orders:*
 - a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.
 - b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.
 - 2. *Work Change Directives:* A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an

adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

3. *Field Orders*: Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.02 *Owner-Authorized Changes in the Work*

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

11.03 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.

11.04 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.
- B. An adjustment in the Contract Price will be determined as follows:
 1. where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or
 2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or
 3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on

the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).

- C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit shall be determined as follows:
1. a mutually acceptable fixed fee; or
 2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;
 - b. for costs incurred under Paragraph 13.01.B.3, the Contractor's fee shall be five percent;
 - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.01.C.2.a and 11.01.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;
 - d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
 - e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
 - f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.
- B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

11.06 *Change Proposals*

- A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under

the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

1. *Procedures:* Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.
 2. *Engineer's Action:* Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.
 3. *Binding Decision:* Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- B. *Resolution of Certain Change Proposals:* If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

11.07 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders covering:
1. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;
 2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;
 3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and
 4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

- B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

11.08 *Notification to Surety*

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

ARTICLE 12 – CLAIMS

12.01 *Claims*

- A. *Claims Process:* The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:
 - 1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;
 - 2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and
 - 3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.
- B. *Submittal of Claim:* The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.
- C. *Review and Resolution:* The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.
- D. *Mediation:*
 - 1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.
 - 2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim

submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.
- E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.
- F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.
- G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

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

13.01 Cost of the Work

- A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:
 1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or
 2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.
- B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:
 1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable

thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. Supplemental costs including the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
 - d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
 - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
 - f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes

other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

C. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.
- 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
- 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
- 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
- 5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee:* When the Work as a whole is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 11.04.C.

E. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

13.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

- B. *Cash Allowances*: Contractor agrees that:
 - 1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
 - 2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.
- C. *Contingency Allowance*: Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

13.03 *Unit Price Work*

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.
- E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:
 - 1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;
 - 2. there is no corresponding adjustment with respect to any other item of Work; and
 - 3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

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

14.01 *Access to Work*

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

14.02 *Tests, Inspections, and Approvals*

- A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.
- B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:
 - 1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
 - 2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
 - 3. by manufacturers of equipment furnished under the Contract Documents;
 - 4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
 - 5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

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

- E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.
- F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to

cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

- A. *Contractor's Obligation:* It is Contractor's obligation to assure that the Work is not defective.
- B. *Engineer's Authority:* Engineer has the authority to determine whether Work is defective, and to reject defective Work.
- C. *Notice of Defects:* Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- D. *Correction, or Removal and Replacement:* Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.
- E. *Preservation of Warranties:* When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.
- F. *Costs and Damages:* In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

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

14.05 *Uncovering Work*

- A. Engineer has the authority to require special inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

- B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.
- C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.
 - 1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.
 - 2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.
- C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will

include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

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

15.01 Progress Payments

- A. *Basis for Progress Payments:* The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.
- B. *Applications for Payments:*
 - 1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
 - 2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
 - 3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.
- C. *Review of Applications:*
 - 1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
 - 2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

- a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or
 - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
 4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work, or
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
 - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
 5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.
 6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
 - a. the Work is defective, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

- e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due:*

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

E. *Reductions in Payment by Owner:*

- 1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
 - a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;
 - b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
 - c. Contractor has failed to provide and maintain required bonds or insurance;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
 - e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
 - f. the Work is defective, requiring correction or replacement;
 - g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - h. the Contract Price has been reduced by Change Orders;
 - i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;
 - j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;
 - k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
 - l. there are other items entitling Owner to a set off against the amount recommended.
- 2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount

remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 15.01.C.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

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

15.03 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

- E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
- F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
 - 1. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.
 - 2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
 - 3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
 - 4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *Final Payment*

- A. *Application for Payment:*
 - 1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of

inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents;
 - b. consent of the surety, if any, to final payment;
 - c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.
 - d. a list of all disputes that Contractor believes are unsettled; and
 - e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

B. *Engineer's Review of Application and Acceptance:*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

- C. *Completion of Work:*** The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.
- D. *Payment Becomes Due:*** Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation,

including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

15.07 *Waiver of Claims*

- A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.
- B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

15.08 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. correct the defective repairs to the Site or such other adjacent areas;
 - 2. correct such defective Work;
 - 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
 - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

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

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:
 - 1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);
 - 2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
 - 3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
 - 4. Contractor's repeated disregard of the authority of Owner or Engineer.
- B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:
 - 1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and
 - 2. enforce the rights available to Owner under any applicable performance bond.
- C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.
- D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.
- E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses,

and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

- F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.
- G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate For Convenience*

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and
 - 3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.
- B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for

expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

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

ARTICLE 18 – MISCELLANEOUS

18.01 *Giving Notice*

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:
 - 1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or
 - 2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 *Computation of Times*

- A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

18.03 *Cumulative Remedies*

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

18.04 *Limitation of Damages*

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

18.05 *No Waiver*

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

18.06 *Survival of Obligations*

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

18.07 *Controlling Law*

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

18.08 *Headings*

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

Supplementary Conditions

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the General Conditions and other provisions of the Contract Documents as indicated below. Any provisions, which are not so amended or supplemented, remain in full force and effect.

TABLE OF ARTICLES

Article 1.0	Definitions
Article 2.0	Reference Standards
Article 3.0	Availability of Lands; Physical Conditions; Reference Points
Article 4.0	Bonds and Insurance
Article 5.0	CONTRACTOR's Responsibilities
Article 6.0	ENGINEER's Status During Construction
Article 7.0	Dispute Resolutions
Exhibit A	New York State Prevailing Wage Rates
Exhibit B	U.S. Department of Labor Davis-Bacon Wage Rates
Exhibit C	EFC Construction Bid Packet
Exhibit E	Public Labor Agreement

ARTICLE 1.0 DEFINITIONS

- A. The OWNER is the **Village/Town of Mount Kisco, NY.**
- B. The terms used in these Supplementary Conditions which are defined in the General Conditions have the same meanings assigned to them in the General Conditions.

ARTICLE 2.0 REFERENCE STANDARDS

- A. The contract work shall be installed in conformance with the following applicable standards as applied:
 - 1. "Recommended Standards for Water Works", (Ten State Standards), 2018, or the latest edition
 - 2. "Recommended Standards for Wastewater Facilities", (Ten State Standards), 2014, or most recent edition
 - 3. "Standard Specifications, Construction and Materials," New York State Department of Transportation, 2017, or most recent edition
 - 4. "New York State Standards and Specifications for Erosion and Sediment Control", NYSDEC, 2017, or most recent edition

ARTICLE 3.0 AVAILABILITY OF LANDS, PHYSICAL CONDITION, REFERENCE POINTS

- A. In the preparation of the Drawings and Specifications, ENGINEER has relied upon:
 - 1. Information for location of existing sewer & water mains provided by the Owner.
 - 2. Site surveys, test borings and excavations, and other site observations made at various times as provided in the bid documents.
 - 3. Tax Maps
- B. Easements
 - 1. The OWNER shall obtain easements for the project prior to any work that will be done on the properties. An easement for construction of the water main was obtained over parcel 82.19-2-11 in the Town of New Castle on lands now or formerly Frederic Vallon & Susan Zamzow.

ARTICLE 4.0 BONDS AND INSURANCE

A. Performance, Payment and other Bonds:

1. CONTRACTOR shall execute bonds as required by Article 6 of the General Conditions and specified below:
 - a. Performance and Payment Bond equal to 100 percent of the contract price. Such Bond to be provided prior to execution of the Contract
 - b. Warranty Bond equal to **25 percent** of the contract price. Such Bond to be provided upon final completion and on commencement of the Warranty period and to remain in effect for **two years**. Or instead, OWNER shall hold retainage for two years.
 - c. Bonds obtained shall be in a form, and from a Surety, acceptable to the Funding Agency or Municipality.
 - d. In the event the Contract Price is adjusted by Change Order by more than ten percent of the Contract price, the OWNER may request that the Bond values be increased accordingly.

B. Contractor's Insurance

1. Statutory Requirements. The contractor shall secure and keep in force all insurances in such amounts as are required by New York State Law and the laws of the United States, including: Worker's Compensation Insurance, NYS Disability Insurance, Unemployment Insurance.
 2. Commercial General Liability Insurance, written on an occurrence form, on a primary and non-contributory basis, by insurance companies authorized to write insurance in New York, insuring against bodily injury and property damage in the following amounts:
 - a. Each Occurrence \$2 million
 - b. General Aggregate \$5 million*
 - c. Personal and Advertising Injury \$2 million
 - d. Products-Completed Operations Aggregate \$2 million
 - e. Fire Damage – any one fire \$500,000 dollars
 - f. Medical Expense – any one person \$50,000 dollars
 - g. Property Damage insurance to include coverage for explosion, collapse and underground hazards.
- * The general aggregate limit applies per project.
3. Automobile Liability insurance covering bodily injury and property damage for owned, non-owned and hired motor vehicles with a combined single limit of liability in the amount of \$1 million dollars.
 4. Umbrella liability insurance policy covering bodily injury and property damage in the amount of \$5million dollars.
 5. Named Insureds. The OWNER, its officers, employees, and engineers shall be named as additional insured on a primary basis for insurances required under subsections B-D supra.

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6. CONTRACTOR shall purchase and maintain an OWNER's and CONTRACTOR's Protective Liability policy in the name of the OWNER for the project, so as to provide dedicated coverage for the Project and the OWNER. Policy shall be in the amount of:
\$2,000,000 per occurrence
\$5,000,000 aggregate.
 7. To protect interests of the OWNER and CONTRACTOR, the CONTRACTOR shall purchase and maintain through the Contract period a full Builders Risk Policy. Such policy shall allow for occupancy and use by the OWNER of the work until such time as the project is final complete and accepted by the OWNER. As part of, or in addition to Builders Risk Policy, CONTRACTOR shall purchase and maintain a policy providing Boiler and Machinery Coverage, including Testing and Turning.
 - a. Builders Risk Policy is not required for this project.
 8. Above insurance requirements shall be binding on Subcontractors as well as the General CONTRACTOR. OWNER may request proof of insurance for any Subcontractor working on the site.
 9. Insurance requirements apply separately to each Contract let under the overall project.

ARTICLE 5.0 CONTRACTOR'S RESPONSIBILITIES

A. Laws and Regulations:

1. Add the following to paragraph 7.10 (A) of the General Conditions:

The Industrial code of the State of New York, Rule 53, Part 53 of Title 12 of the Compilation of Codes, Rules and Regulations (12 NYCRR 53) - Construction, Excavation and Demolition Operations at or near underground facilities - Effective April 1, 1975.

This Rule, Part 53 of Title 12 of the Compilation of Codes related to Construction, Excavation and Demolition Operations at or near underground facilities in order to assure safety and prevent damage to public or private property.

B. Indemnification

1. Add the following provisions to paragraph 7.18 of the General Conditions:

Indemnification shall include, to the extent allowed by law, workplace safety and third-party over suits. Subcontractors shall also be subject to indemnification requirements.

ARTICLE 6.0 ENGINEER'S STATUS DURING CONSTRUCTION

A. Project Representation:

Add two new Paragraphs immediately after Paragraph 10.03 of the General Conditions, which are to read as follows:

1. The terms Resident Project Representative and RESIDENT ENGINEER shall be used interchangeably.

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2. The RESIDENT ENGINEER shall maintain a force for inspection of construction, which shall consist of a field staff and supporting personnel required in connection therewith. Nothing in the OWNER/ENGINEER agreement or in the Contract Documents shall be construed to make the RESIDENT ENGINEER a guarantor of the performance of the CONTRACTOR or others, nor shall any provision in this agreement be construed as giving the RESIDENT ENGINEER, on its own behalf or on behalf of the OWNER, the responsibility for or the authority to direct or supervise construction methods, techniques, procedures or safety measures. The RESIDENT ENGINEER will not be responsible for the enforcement of the obligations of the CONTRACTOR or others, nor their failure to execute the Work in accordance with the Contract Documents and within the time period specified.

The services furnished hereunder can be generally described as follows:

- a. Schedules: The RESIDENT ENGINEER shall review the CONTRACTOR'S progress schedules, schedule of Shop Drawings, and other schedules prepared by the CONTRACTOR and review and report to the OWNER as to their acceptability.
- b. Conferences: The RESIDENT ENGINEER shall arrange, schedule and conduct pre-construction conferences, progress meetings and other job conferences as may be required, and notify in advance those who are expected to attend.
- c. Liaison: The RESIDENT ENGINEER shall serve as the OWNER'S on-site liaison with the CONTRACTOR concerning the CONTRACTOR'S performance under the terms of its Contract.
- d. Shop Drawings and Samples: The RESIDENT ENGINEER shall receive and record the date of receipt, and monitor transmission of Shop Drawings, Samples, and test data submitted by the CONTRACTOR, and shall receive and record the date of receipt thereof, and monitor the transmission of the above-referenced submissions which have been reviewed.
- e. Inspection of Materials and Equipment: The RESIDENT ENGINEER shall inspect and approve or reject construction materials and equipment to determine their general compliance with the Contract Documents.
 1. In the event the OWNER engages an independent testing laboratory to conduct tests on materials and equipment, then the RESIDENT ENGINEER shall cooperate with said independent testing laboratory to determine general compliance with the Contract Documents.
 2. The RESIDENT ENGINEER shall report to the DESIGN ENGINEER whenever he believes that Work is unsatisfactory, faulty, defective, has been damaged, does not conform to the Contract Documents, or does not meet the requirements of inspections, tests or approvals required to be made, and shall advise the DESIGN ENGINEER when he believes Work should be corrected, rejected, uncovered for observation, or requires special tests or inspection.
 3. The RESIDENT ENGINEER shall verify that tests, equipment and systems start-up and operating and maintenance instructions are followed and conducted by the CONTRACTOR in the presence of the appropriate personnel, as required by the Contract Documents, and that the CONTRACTOR maintains adequate records thereof.

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- f. Change Orders and Supplemental Agreements: The RESIDENT ENGINEER shall prepare all Change Orders and supplemental agreements in the form and manner approved by the OWNER, for authorized alterations to the Work as provided for under the Contract Documents.
 - g. Records: The RESIDENT ENGINEER shall maintain at the job site orderly files for correspondence, reports or job conferences, Shop Drawing and Sample submissions, reproductions of original Contract Documents including Addenda, authorized alterations to the Contract Documents, Change Orders, Field Orders, additional drawings issued subsequent to the execution of the Contract, clarification letters, and other alterations to the Contract Documents, interpretations of the Contract Documents, progress reports, and other Project related documents.
 - h. CONTRACTOR'S Claims: The RESIDENT ENGINEER shall investigate and furnish to the OWNER information relating to the CONTRACTOR'S claims and make recommendations with regard to payment of such claims.
 - i. Reports: The RESIDENT ENGINEER shall furnish the OWNER with monthly reports as required, of the progress of the Work and of the CONTRACTOR'S compliance with the approved progress schedule, schedule of Shop Drawings submissions and other schedules.
 - 1. The RESIDENT ENGINEER shall notify the OWNER of permanent Work which does not conform to the results required in the Contract Documents, prepare written reports describing any apparent, nonconforming Work and make recommendations to the OWNER for its correction and, at the request of the OWNER notify the CONTRACTOR of RESIDENT ENGINEER'S directions for correction of nonconforming Work.
 - 2. The RESIDENT ENGINEER shall prepare completion lists when substantial Completion of the Project is claimed by the CONTRACTOR. The RESIDENT ENGINEER shall measure pay items of Work.
 - j. CONTRACTOR'S Requests for Payment: The RESIDENT ENGINEER shall review the CONTRACTOR'S Application for Payment and shall certify that the Work has progressed to the point indicated by the CONTRACTOR, that to the best of his knowledge, information and belief, based on its inspection and review, the Work is in accordance with the Contract Documents, and that the CONTRACTOR is entitled to the payment of the amount certified.
 - 1. The RESIDENT ENGINEER'S certification shall be subject to an evaluation of the Work as a functioning project upon Substantial Completion, and to the results of any subsequent tests required by or performed under the Contract Documents, and to minor deviations from the Contract Documents, correctable prior to completion, and to any additional specific qualifications stated in the certificate.
 - 2. By approving an Application for Payment, the RESIDENT ENGINEER will not be deemed to have represented that he has made any determination as to how or for what purpose any CONTRACTOR has used the monies paid on account of the Contract Price, or that title to any of the CONTRACTOR'S Work, materials, or equipment has passed to the OWNER free and clear of any liens, claims, security, interest or encumbrances.
 - k. Drawings: The RESIDENT ENGINEER shall, based on documentation provided by the CONTRACTOR, and collected and reviewed by said RESIDENT ENGINEER, prepare record drawings

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1. Guarantees, Certificates, and Inspections Prior to Guarantee Period: During the course of the Work, the RESIDENT ENGINEER shall verify that guarantees, certificates, maintenance and operation manuals, and other data required to be assembled and furnished by the CONTRACTOR, are applicable to the items actually installed, and shall deliver these items and information to the OWNER prior to the final acceptance of the Project.
 1. The RESIDENT ENGINEER and OWNER shall make an inspection approximately ninety days prior to the expiration of the guarantee period of the Contracts. The RESIDENT ENGINEER shall submit a written report to the OWNER listing discrepancies between guarantees and performance.
 2. The RESIDENT ENGINEER shall assist in efforts to effect and expedite the correction or adjustment of CONTRACTOR'S defective Work, if any. The RESIDENT ENGINEER shall conduct final inspection to verify that the defective Work has been corrected or adjusted, and shall make recommendations to the OWNER concerning its acceptance.
 3. The RESIDENT ENGINEER shall arrange for instruction by the CONTRACTOR and the manufacturer's representatives to the OWNER or its designated representatives concerning the proper operation and maintenance of the equipment furnished and installed for the Project.

ARTICLE 7.0 DISPUTE RESOLUTIONS

- A. Disputes shall be resolved in accordance with the General Conditions.
- B. Compliance With Laws:
 1. The CONTRACTOR shall abide by all local and State Laws or ordinances to the extent that such requirements do not conflict with Federal laws or regulations.
 2. It is further understood and agreed between the parties that each and every other provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein and that this Contract shall be read and enforced as though the same were included herein.
- C. Safety and Health Regulations:
 1. The CONTRACTOR shall comply with the Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54).
 2. The attention of the CONTRACTOR is directed to the provisions of Section 4(b)(4) of the Occupational Safety and Health Act of 1970, as follows:

"Nothing in this Act shall be constructed to supersede or in any manner affect any workman's compensation law or to enlarge or diminish or affect in any manner the common law or statutory rights, duties, or liabilities of employers and employees under any law with respect to injuries, disease, or death of employees arising out of, or in the course of, employments."
 3. The CONTRACTOR shall at all times, comply with the latest applicable State Laws pertaining to the Safety of Workers in the Construction Field.

END OF SECTION

Special Conditions

SPECIAL CONDITIONS

1. SCOPE

The intent of this section is to describe and clarify special conditions which relate to this project. Special Conditions which differ (or are in conflict) with the Supplemental Conditions - or the policies of other agencies (public or private) which have jurisdiction by law - shall be brought immediately to the attention of the Engineer.

2. TOOLS, MANPOWER, AND EQUIPMENT

If - at any time before the commencement or during the progress of the work - the tools, manpower, or equipment appears to the Engineer to be insufficient, inefficient, or inappropriate to secure the quality of work required (or the proper rate of progress), the Engineer may order the Contractor to increase the efficiency, to improve the character, to increase the number, or to substitute new tools, plant, or equipment (as the case may be) and the Contractor must conform to such order.

Before executing any sub-contract, the successful Bidder as Contractor shall submit the name of any proposed subcontractor for prior approval.

3. PERMITS

The Engineer has endeavored to obtain all permits (unless indicated elsewhere), with the exception of Local Building Permits and Highway Work Permits. Contractor shall promptly apply for all permits which are required for completion of the work, including but not limited to NYSDOT and Town of Bedford Highway Work Permits. Contractor shall complete all application forms, pay all fees or bonds, and provide documentation as requested by the permit agency.

4. APPROVABLE MANUFACTURERS OR SUPPLIERS

Where "Approved Manufacturers or Suppliers" are listed, or where a particular manufacturer's products is listed, the reference shall be taken to include the qualification of "or equal as approved by the Engineer." If Contractor proposes "or-equal" items, the burden for demonstrating this equivalency shall rest on the Contractor. The Engineer shall retain the right of approval over proposed "or-Equal" items and shall in making an evaluation and determination consider the durability, reliability, life-cycle costs, ease of repair, technical service, and other like factors in addition to the proposed substitutes attainment of design standards for the new product. The only allowable equipment is such that is manufactured in the United States.

5. PERFORMANCE WARRANTY

The Contractor shall furnish (at the Contractor's expense) a one (1) year Warranty, with respect to all materials, equipment, and construction. This Warranty shall commence upon Substantial Completion of the work, regardless of earlier occupancy or use of parts of the work. All Warranty issues identified by the Engineer in writing during the one year Warranty period shall be resolved by the Contractor to the Owner's satisfaction. The Owner may require the Contractor to furnish (at the Contractor's expense) a special performance Warranty or other surety over and above the one (1) year Warranty, with respect to materials or equipment substitutions. If Contractor fails to act to resolve Warranty issues within 30 days of written notice, or such lesser period as may be dictated by the Owner's needs to use facilities subject to the Warranty, the Contractor will be considered to be in default of his Warranty obligations. In the event of such default, Owner may make other arrangements to remedy the Warranty problem and claim all direct and incidental costs against Contractor's Warranty Bond

6. MAINTENANCE OBLIGATION

If, at any time during the performance of the Contract, defects in the work shall develop or be discovered, the Contractor shall promptly repair or replace the defective workmanship or materials

even though such workmanship or materials have already passed inspection. The Contractor will be required to perform maintenance in all areas of finished road surfaces where defects and/or settlement has occurred. These areas shall be repaired promptly and under the direction of the Engineer with the materials and procedures stated in the Specifications section that applies.

Contractor shall furnish and maintain fuel, electric, and consumable supplies (such as chemicals) from the period of initial start-up of systems until Substantial Completion for the Work and acceptance by the owner.

The Contractor shall maintain all areas of work and storage in a neat and orderly condition at all times.

The Contractor - at the end of each day - will be required to remove (and dispose of properly) scattered piles of debris, surplus materials, construction equipment, or any obstructions deemed by the Engineer (or any other agency having Jurisdiction) which create a health or safety hazard to the public.

The Contractor shall keep all existing facilities - such as storm drains, culverts, catch basins, ditches, and all public and private utilities in the area of construction - clean and operational during construction. All excavations shall be backfilled to grade at the end of each day, unless the Engineer approves the use of fencing and barricades. At the end of each day, all areas disturbed (which are used for public or private, pedestrian or vehicular traffic) shall be made accessible for its intended use, with proper signs and safety devices installed for the protection of the public. As work progresses in the various areas of construction, all traffic areas shall be kept broom-cleaned, with a dust suppressor used as directed by the Engineer. Prior to final restoration, all areas disturbed during construction shall be maintained. Clean-up of areas requested by the Engineer shall be done promptly and to the satisfaction of the Engineer.

7. LIQUIDATED DAMAGES

The OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and that the OWNER will suffer financial loss if the work is not completed within the times specified In the Contract Agreement plus any extensions thereof allowed in accordance with Article 11, "Change of Contract Time", of the General Conditions. They also recognize the delays, expense, and difficulties involved in proving legal arbitration proceeding the actual loss suffered by the OWNER if the work is not completed on time. Accordingly, Instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as penalty), CONTRACTOR shall pay OWNER, for each day that expires after the time specified in the Contract Standard Form of Agreement, the following Stipulated Penalties: (see Standard Agreement)

8. CONSTRUCTION DOCUMENTATION

A. "As-Built" Drawings: The Contractor shall note, on a set of the Contract Drawings kept especially for this purpose, the final locations and details of construction, the location of underground utilities, and obstructions, and any other pertinent information necessary for preparation of "As-Built" drawings.

B. Photographs: The Contractor shall furnish preconstruction photographs (or videotapes), to show the conditions existing prior to construction. Photographs shall be legible, complete, and marked with the direction of view, station, and date. The Contractor shall furnish Progress photographs shall be taken monthly and as directed by the Engineer. Original prints and negatives for Preconstruction and Progress Photographs shall be furnished to the Engineer and shall become part of the record to be retained by the Owner upon completion of the project.

9. **COMMUNICATIONS**

A. **Written Communications:** All notices, demands, requests, instructions, approvals, proposals, and claims must be in writing. Any notice to or demand shall be sufficiently given if delivered at address stated on the signature page of the Agreement. Any such notice shall be deemed to have been given as of the time of actual delivery. All urgent matters should be sent by Overnight Mail or by facsimile with an original by Registered Mail.

B. **Project Meetings:** Contractor shall arrange meetings, schedule attendance of necessary parties, and record and distribute minutes. Meetings shall include, at a minimum, Pre-construction Conference, Bi-Weekly Progress Meetings (as needed), Substantial Completion Meeting, and Final Inspection. At routine Progress Meetings, the Contractor shall present: a review of work progress since the previous meeting, conflicts and resolutions for problems, scheduling issues or delays and their resolution, potential changes orders or delays, and other business as directed by the Engineer in advance of the meeting.

10. **PAYMENT TO CONTRACTOR**

Progress payments will be made to the Contractor by the Owner, based on a monthly work performance period ending on the last day of the month. The estimate for in-place work performed during the preceding period must be duly certified and approved by the Owner. The Contractor will be directed in writing as to the schedule on which payments must be submitted.

At the sole discretion of the Owner, and in consideration of the general progress of the work, partial payments may be made for materials delivered and stored on the project site. Payments will be only in the amount of the raw materials costs, as documented by paid receipts, and may not exceed any scheduled value of the material.

All work paid for shall thereupon become the sole property of the Owner, but this provision shall not be construed as relieving the Contractor from the sole responsibility for the care and protection of the work for which payments have been made or the restoration of any damaged work, or as a waiver of the right of the owner to require fulfillment of all terms of the Contract.

11. **SCHEDULING AND WORK HOURS**

Unless special permission is given by the Engineer, all work shall be done between 7:00 A.M. and 5:00 P.M., Monday through Friday. CONTRACTOR shall prepare, coordinate, and maintain the contract completion schedule. Where requested by the Engineer due to the complexity of the project, the Schedule presented shall be a "bar-type" schedule which shows major tasks, completion dates, and potential conflicts. Contractor shall revise Construction Progress Schedule monthly to reflect changes in progress of the work. The Contractor shall be solely responsible for obtaining any dispensation required by the Department of Labor for overtime, night, holiday, or weekend work, as well as for payment of wage supplements required as a result.

12. **SUBMITTALS**

A. **Shop Drawings:** CONTRACTOR shall review Shop Drawings and product data prior to submittal, verify field dimensions and suitability, document conformance with the Plans, and schedule submittals so as to not delay the work. Contractor shall review and note his approval on each submittal, prior to its delivery to the Engineer. Each submittal shall be numbered, identify the manufacturer, list model or part numbers, provide weights and dimensions, and include any other pertinent data required by Engineer for review. Upon approval, Contractor shall distribute approved submittals to the Contractor's field office, and to Subcontractors, suppliers, fabricators and other Contractor's affected. Contractor shall allow up to 14 days review by the Engineer, and should specifically request expedited review if needed. Submit at least three (3) copies for review.

B. Test Results: Results of concrete, soil, and other materials testing (where required) shall be distributed to the Engineer, the Engineer's Field Office, and affected Subcontractor's immediately upon receipt of the data. Contractor shall review test results and note any results which do not meet the project requirements.

C. Operation and Maintenance Data: Contractor shall compile manuals, installation instructions/packing documents, and copies of purchase orders for all components installed and bind these documents into an Owner's O&M Manual. Manual shall be indexed and tabbed and suitable for use by the Owner and Operator. Submit Draft for Engineer's approval and three (3) final copies, Engineer will retain two copies.

13. LAYOUT OF WORK

The contractor shall perform all layout work necessary for the satisfactory execution of the construction for the contract as shown on the contract Drawings, and all costs in connection therewith shall be included in the Contract price(s). The contractor shall verify all dimensions on the drawings and shall be responsible for same.

All construction shall be installed to the lines and grades as shown on the Contract Plans. Any discrepancies, obstructions, or conflicts, which are encountered, shall be brought to the immediate attention of the Engineer in the field. All work shall be laid out a minimum of 200 feet in advance. All existing utilities and underground structures or facilities are to be located by the Contractor a minimum of fifteen hundred (1500) feet ahead of actual construction. Any abrupt changes in vertical or horizontal alignment, slope, or field conditions which differ substantially from the Contract Plans and Specifications shall be brought to the attention of the Engineer in writing.

The Contractor will be held responsible for the protection and safe-guarding of all control points and bench marks set by the Engineer for this Contract. Any replacement or re-establishment of control points or bench marks by the Engineer shall be at the expense of the Contractor for whom the bench mark was originally set.

14. LIMIT OF WORK AREA

Easements for the purpose of this Contract will be provided by the Owner. If the Contractor desires the temporary use, during construction, of lands to which the Owner has no rights, the Contractor shall secure written permission from the appropriate property owners and shall file a duplicate copy of such permission with the Engineer. Land shall not be used or occupied by the Contractor prior to the securing of permission. The Contractor shall at all times save harmless the Owner from actions by third parties, by reason of any acts or omissions by the Contractor.

Before final acceptance of the work - and as a prerequisite to the release of the final payment - the Contractor shall secure a written release - from the authorities or owners having jurisdiction over the lands (including easements) occupied by the Contractor - certifying to the satisfactory restoration of all pavements, other surfaces, and utility structures removed or safeguarded for the-work.

The Contractor shall confine all materials - and their storage and the operations of the Contractor's workmen - to the limits indicated by laws, ordinances, permits, directions of the Engineer, and as shown on the Plans. The Contractor will not unreasonably encumber the premises with such materials, but shall store them in orderly fashion, such that they will not interfere with the work under this Contract (or other contracts) or with the operation of the owner's facilities.

Should the Owner provide the land for materials, equipment, trailers, and automobiles, such items shall be stored in the areas designated on the Plans. The Contractor shall mark and place barriers to limit such storage areas.

15. TEMPORARY FACILITIES

A. General: The Contractor shall provide temporary power, heating, telephone, and water service, and the sanitary facilities, for his operations throughout the construction period. At the completion of the work, or when the temporary services are no longer required, the temporary facilities shall be restored to their original conditions. All costs in connection with the temporary utilities - including, but not limited to, installation, utility company service charges, maintenance, relocation, and removal - shall be borne by the Contractor. Contractor shall furnish and maintain fuel, electric, and consumable supplies (such as chemicals) from the period of initial start-up of systems until Substantial Completion for the Work and acceptance by the owner.

B. Specific Facilities Required: Provide and maintain signage, traffic warning and control devices, and flagmen as required to provide safe working conditions, limit the risk of accidents, and meet the requirements of the appropriate authorities. Provide and maintain temporary sanitary toilet facilities conforming to state and local health and sanitation regulations, in sufficient number for use of Engineer's, Contractor's and Subcontractor's employees. Provide and maintain secure enclosed storage facilities or fencing for equipment and materials stored on site. Provide and maintain temporary lighting meeting code requirements and sufficient to enable Contractor to complete Work and Engineer to observe work as it is being performed. Provide and maintain temporary heat and construct temporary enclosures as necessary for proper completion of the work. Make arrangements and pay fuel costs, supervise, and maintain heating units. Construct and maintain temporary site roadways in snow free, ice free, driveable condition necessary to carry out construction operations.

C. Housekeeping: The Contractor shall keep the work and storage areas in a neat and orderly condition at all times. All scattered piles of material, trash, and debris shall be cleaned up daily and removed from the site weekly - or more frequently, as directed by Engineer. The Contractor shall store all potentially hazardous materials in a manner approved by the Engineer and keep all equipment and machinery in good working order. Any leaks, spills, or discharges created by or as a result of construction shall be promptly and thoroughly cleaned up, according to the rules and regulations prescribed by NYSDEC.

16. PROJECT SIGNS

The DWSRF project sign, if required, shall be furnished and installed by Contractor. Each Contractor shall be responsible for providing their own traffic control signs and other safety signs as required.

17. ENVIRONMENTAL CONTROLS

Contractor shall: provide erosion control measures in place before commencing work on project site, maintain erosion control measure during construction, and remove erosion control measures upon establishment of permanent, surface stabilization. Contractor shall take such measures as may be required to prevent degradation of stream water quality during his work.

Site clearing will be limited to the area shown on the plans unless otherwise approved by the Engineer. Trees and brush may not be piled on the site, and shall be cut up and removed as clearing progresses.

Any excess soil and rock removed from the site shall be disposed at a point designated by the Owner. All brush and debris removed from the site shall be disposed as listed above or disposed at Contractor's expense in accordance with NYSDEC requirements.

Minimize air pollution by requiring use of properly operating combustion emission control devices on construction vehicles and equipment and encourage shutdown of motorized equipment not in use.

Do not burn trash on construction site. Maintain road and work areas so as to control dust through water spray or other means. Generally, no visible dust should result from traffic or operations.

Conduct operations to minimize disturbance to residents in vicinity of Work, and comply with applicable local ordinances. Assure that exhaust mufflers and silencer devices are in good working order. Maintain noise levels below 50 decibels at the property lines where homes or commercial property abut the construction site.

Route vehicles carrying rock, concrete or other material over such streets as will cause least annoyance to public and do not operate on public streets between hours of 6:00 p.m. and 7:00 a.m., or on Saturdays, Sundays or legal holidays unless approved by Owner.

Fuel storage area and fuel equipment shall be approved by Owner prior to installation. Submit containment provisions to Owner for approval. Report spills or leaks from fueling equipment or construction equipment to Owner and cleanup as required. Owner may require Contractor to remove damaged or leaking equipment from Project site. Do not change oil on equipment or store or dispose of fuels, solvents, lubricants, or other potentially hazardous materials on site.

18. FAMILIARITY WITH SITE CONDITIONS

The Contractor shall inspect the site and become acquainted with all the field conditions on which the work is dependent. The Contractor is advised that sheeting, shoring, bracing, and dewatering of excavation may be required for the safety of excavations where required by subsoil conditions. No extra costs will be allowed by this work. The Contractor acknowledges satisfaction 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, water, electric power, and roads; the uncertainties of weather, ground water table, or similar physical conditions at the site; the conformation and condition of the ground; the character, quality, and quantity of surface and subsurface materials to be encountered; the character of equipment and facilities needed prior to and during the prosecution of the work; and -all other matters which can in any way affect the work or the cost thereof under this Contract. Any failure by the contractor in becoming acquainted with all the available information concerning these conditions will not relieve him of the responsibility for estimating properly the difficulty or cost of successfully performing the work.

19. TESTING LABORATORY

Contractor shall employ testing labs as required in the Specifications. Additional testing shall also be conducted (at the Contractors expense) when directed by the Engineer, to verify the conformance of the work with the specifications.

20. TEMPORARY SUSPENSION OF WORK DUE TO WEATHER

All work to be performed under the Contract shall be completed within the time stated in the Agreement or within such extended time for completion as may be granted by Change Order. If, during the progress of the work, it should become necessary because of the lateness of the season, to stop the work, the Contractor shall open proper drainage ditches, erect temporary structures, install temporary materials, and winterize the project so that there will be a minimum of interference with traffic or deterioration of the work already performed. Temporary materials - such as bituminous asphalt, cold mix, and calcium chloride - shall be installed and maintained throughout the Winter. Temporary materials shall be graded and compacted to keep the Contract in First Class condition for snow plows and traffic. The Contractor shall take every precaution to prevent any damage or unreasonable deterioration of the work during the time the project is shut down. Unless there are exceptions specifically approved by the Engineer, seasonal limitations for material installations shall be as specified in the NYSDOT Standard Specifications. All materials, labor, and equipment necessary to winterize the project shall be the responsibility of the Contractor. No payment will be

made for any temporary work. The cost anticipated shall be incorporated into the bid items of the Bid Proposal.

21. MATERIAL, CONTROL, AND CERTIFICATION

A. Certifications: Material certifications from manufacturers and/or suppliers shall be supplied for each product cited in the appropriate Section of the Specifications, or as requested by the Engineer prior to installation. Additional testing, certifications, or performance guarantees may be required on material or product substitutions anticipated for use by the Contractor. All additional costs associated with any substitutions shall be borne by the Contractor (as stated in the General Conditions, Article 7.05).

B. Controls: Unless otherwise specified, all materials shall be new and of first quality. The source of supply of each of the materials shall be approved by the Engineer before delivery is started. Representative preliminary samples (of the character and quality specified) shall be submitted by the Contractor or producer for examination, -and tests shall be conducted in accordance with A.S.T.M. or other generally-recognized standards which regulate the particular industry or product. Only materials so tested and found to conform to the requirements of these Specifications shall be used in the work. All materials proposed for such incorporation may be inspected or tested at any time during their preparation or use. If, after trial, it is found that some approved sources of supply do not provide a uniform, acceptable product, the Contractor shall furnish the acceptable material from other approved sources. No material which, after approval, has in any way become unfit for use shall be used in the work, and stored material - even though approved prior to being stored - shall be inspected before use in the work and shall meet the requirements of the Specifications at the time of such use.

22. PROJECT CLOSE-OUT.

A. Prerequisites

The contractor shall comply with all the General Conditions and complete the following before requesting a final inspection and Certificate of Substantial Completion:

1. Submit executed warranties, workmanship bonds, maintenance agreements, Inspection certificates, and similar required documentation for specific units of work - enabling Owner's unrestricted occupancy and use.
2. Submit record documentation, maintenance manuals, tools, spare parts, keys, and similar operational Items.
3. Complete instruction of owner's operating personnel and start-up of systems.
4. Complete final cleaning and remove temporary facilities and tools.
5. Submit executed close-out documents, including: Release of Liens, Surety's Release, Warranty Bonds (where required in the Supplemental Conditions or as a result of the conditional acceptance of work or materials), written Release of Claims for subcontractors or suppliers (when required by the Engineer).
6. Obtain approvals including Occupancy Permit, Electrical Underwriters Certificate, releases and approvals for work done in easements, and such other approvals as may be required to allow full use by the Owner of the completed works unencumbered by Liens or Claims resulting from the Work.

B. Record Documents

The Contractor shall furnish the following:

1. The Contractor shall note, on a set of contract drawings kept especially for this purpose, the final locations and details of construction, the location of underground utilities and obstructions, and any other pertinent information necessary for preparation of "As-Built" drawings.

-
2. Operation and Maintenance Manuals - The Contractor shall request from the -supplier/manufacture a minimum of three (3) copies of such documents, to be provided to the Engineer for each piece of equipment and system installed.
 3. Installation Instructions and Catalog Cuts - The contractor shall provide the Owner with one (1) copy of all installation instructions received for items such as light fixtures, door hardware, etc.
 4. Equipment Start-up - The Contractor shall provide, as part of the Contract, a qualified Manufacturer's Representative to: Inspect the installation, Service the equipment (as required), Adjust and calibrate the equipment (as necessary), Instruct the owner's Representative in the operation and maintenance of the equipment, and provide a written report and certification to the Contractor and the Engineer, for each piece of equipment or system in the Contract.

C. FINAL CLEANING

At the time of Project Close-out, the Contractor shall clean (or re-clean) the work to the condition expected from a normal, well maintained facility, including: Remove non-permanent protection and labels, Polish glass, Clean exposed finishes, Touch-up minor finish damage, Clean or replace mechanical system filters, remove debris, Broom-clean unoccupied spaces, Clean light fixtures and replace burned-out lamps, Sweep and wash paved areas, Clean yard and grounds.

23. **DRAWINGS AND SPECIFICATIONS - DEFINITIONS AND PRECEDENCE**

A. GENERAL

The intent of the Plans and Specifications is that the Contractor shall furnish all labor, materials, tools, equipment, and transportation necessary for the proper execution of the work, in accordance with the Contract Documents. It is understood, that the Contractor is familiar with construction projects of this type and size, and that generally-accepted construction practices will be applied in order to complete the project in an acceptable manner. All incidental work, whether or not it is shown in the Plans or stated in the specifications, is expected to be, carried out in order to achieve the desired result - which is a complete facility, ready for use, occupancy, or operation by the Owner.

B. DEFINITION AND PRECEDENCE

1. In case of a conflict between the Plans and the Specifications, the Specifications shall govern.
2. Dimensions on the Drawings shall govern over scaled dimensions.
3. Detail Drawings shall govern over general Drawings.
4. General Notes on the Plans apply to all Contract areas.
5. Special Notes on a plan apply to a specific Drawing or condition of the Plans.
6. The Standard General Conditions of the Contract set forth the principal Contract provisions governing the main parties involved. The General Conditions define the rights, responsibilities, and relationships of those parties.
7. The Special Conditions of the Contract modify and adapt the standardized General Conditions to fit the specific requirements of the project.
8. The Supplemental Conditions of the Contract - describe or identify the general rules and regulations of the other parties, which have (in whole or in part) involvement in the project by law.
9. The Contract Specifications - set forth technical information concerning materials, components, systems, and equipment to be furnished and installed - as indicated in the Contract Plans. These Specifications state the quality, performance, characteristics, and results to be achieved by application of construction methods.

C. RESOLUTION OF DISCREPANCIES

Any discrepancies found between the Drawings, the Specifications, and the site conditions - or any other inconsistencies or ambiguities - shall be reported immediately in writing to the Engineer, who shall promptly respond (in writing) to correct the situation. Any work performed by the Contractor (after the discovery of such discrepancies) shall be done at the Contractor's risk.

END OF SECTION

Exhibit A

New York State Prevailing Wage Rates



Kathy Hochul, Governor

Roberta Reardon, Commissioner

Mount Kisco

Mary Holton
28 Madison Avenue Extension
Albany NY 12203

Schedule Year 2021 through 2022
Date Requested 10/28/2021
PRC# 2021011221

Location Mount Kisco
Project ID# 1-4
Project Type Upgrades to Saw Mill pump station. New pumping systems, influent grinders, piping mods, control system upgrades and general building upgrades, roof replacement, electrical upgrades to backup

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 2021 through June 2022. 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.ny.gov. 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 ["Request for a dispensation to work overtime" form \(PW30\)](#) and ["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.ny.gov.

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.ny.gov.

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.ny.gov.

Payrolls and Payroll Records

Every contractor and subcontractor MUST keep original payrolls or transcripts subscribed and affirmed as true under penalty of perjury. As per Article 6 of the Labor law, contractors and subcontractors are required to establish, maintain, and preserve for not less than six (6) years, contemporaneous, true, and accurate payroll records. 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, but 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 journeymen 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 journeyman'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.



Kathy Hochul, Governor

Roberta Reardon, Commissioner

Mount Kisco

Mary Holton
28 Madison Avenue Extension
Albany NY 12203

Schedule Year 2021 through 2022
Date Requested 10/28/2021
PRC# 2021011221

Location Mount Kisco
Project ID# 1-4
Project Type Upgrades to Saw Mill pump station. New pumping systems, influent grinders, piping mods, control system upgrades and general building upgrades, roof replacement, electrical upgrades to backup

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: \$ _____	Contract Type:	
Approximate Starting Date: ____/____/____	<input type="checkbox"/> (01) General Construction	
Approximate Completion Date: ____/____/____	<input type="checkbox"/> (02) Heating/Ventilation	
	<input type="checkbox"/> (03) Electrical	
	<input type="checkbox"/> (04) Plumbing	
	<input type="checkbox"/> (05) Other : _____	

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

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

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. <https://labor.ny.gov/formsdocs/ui/IA999.pdf>

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.ny.gov.

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

Effective June 23, 2020

This provision is an addition to the existing 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 and supplement 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 job classification. The required notification will be provided with each wage schedule, may be downloaded from our website www.labor.ny.gov or be made available upon request by contacting the Bureau of Public Work at 518-457-5589. *In the event the required information will not fit on the pay stub, an accompanying sheet or attachment of the information will suffice.

(12.20)

**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

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.



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. These include:

- Unemployment Insurance benefits, if you are 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 and Unemployment Insurance contributions required by New York State and Federal Law.**

Penalties for paying workers 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 or 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 (866) 435-1499 or send an email to dol.misclassified@labor.ny.gov. All complaints of fraud and violations are taken seriously. You can remain anonymous.

Employer Name:

IA 999 (09/16)

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: _____

Requirements for OSHA 10 Compliance

Article 8 §220-h requires that when the advertised specifications, for every contract for public work, is \$250,000.00 or more the contract 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 or 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 518-457-5589.

WICKS

Public work projects are subject to the Wicks Law requiring separate specifications and bidding for the plumbing, heating and electrical work, when the total project's threshold is \$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 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 the 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.

Contractors must pay subcontractors within a 7 days period.

(07.19)

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.

Payrolls and Payroll Records

Contractors and subcontractors are required to establish, maintain, and preserve for not less than six (6) years, contemporaneous, true, and accurate payroll records.

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.

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. Although in most cases the payment or provision of supplements is straight time for all hours worked, some classifications require the payment or provision of supplements, or a portion of the supplements, to be paid or provided at a premium rate for premium hours worked. Supplements may also be required to be paid or provided on paid holidays, regardless of whether the day is worked. The Overtime Codes and Notes listed on the particular wage classification will indicate these conditions as required.

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.ny.gov) 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

Westchester County General Construction

Boilermaker

10/01/2021

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: 07/01/2021

Boilermaker	\$ 63.38
Repairs & Renovations	63.38

SUPPLEMENTAL BENEFITS

Per Hour: 07/01/2021

Boilermaker	32% of hourly
Repair & Renovations	Wage Paid
	+ \$ 25.38

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 percentage of Boilermaker's Wage

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

Supplemental Benefits Per Hour:

	07/01/2021
Apprentice(s)	32% of Hourly
	Wage Paid Plus
	Amount Below

1st Term	\$ 19.41
2nd Term	20.26
3rd Term	21.11
4th Term	21.96
5th Term	22.82
6th Term	23.68
7th Term	24.52

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

4-5

Carpenter

10/01/2021

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

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

WAGES

Per hour: 07/01/2021

Piledriver	\$ 56.93
Dockbuilder	\$ 56.93

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker \$ 53.33

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
\$23.37	\$28.97	\$37.35	\$45.74

Supplemental benefits per hour:

All Terms: \$ 35.33

8-1556 Db

Carpenter

10/01/2021

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

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

WAGES

Per hour: 07/01/2021

Carpet/Resilient

Floor Coverer \$ 54.75

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

SUPPLEMENTAL BENEFITS

Per hour:

\$ 46.97

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
\$ 24.55	\$ 27.55	\$ 31.80	\$ 39.68

Supplemental benefits per hour:

1st	2nd	3rd	4th
\$ 16.19	\$ 17.69	\$ 21.29	\$ 23.29

8-2287

Carpenter

10/01/2021

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

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

WAGES

Per Hour: 07/01/2021

Marine Construction:

Marine Diver	\$ 71.80
Marine Tender	51.34

SUPPLEMENTAL BENEFITS

Per Hour:

Journeyworker \$ 53.33

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

REGISTERED APPRENTICES

Wages per hour:

One (1) year terms.

1st year	\$ 23.37
2nd year	28.97
3rd year	37.35
4th year	45.74

Supplemental Benefits

Per Hour:

All terms \$ 35.33

8-1456MC

Carpenter

10/01/2021

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

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

WAGES

Per hour: 07/01/2021

Building	
Millwright	\$ 57.00

SUPPLEMENTAL BENEFITS

Per hour:

Millwright \$ 54.60

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.

REGISTERED APPRENTICES

Wages per hour:

One (1) year terms:

1st.	2nd.	3rd.	4th.
\$30.74	\$36.19	\$41.64	\$52.54

Supplemental benefits per hour:

One (1) year terms:

1st.	2nd.	3rd.	4th.
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\$35.03 \$38.73 \$43.08 \$49.84

8-740.1

Carpenter

10/01/2021

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

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

WAGES

Per Hour:

07/01/2021

Timberman

\$ 52.05

SUPPLEMENTAL BENEFITS

Per Hour:

07/01/2021

\$ 52.78

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:

One (1) year terms:

1st	2nd	3rd	4th
\$21.42	\$26.53	\$34.18	\$41.84

Supplemental benefits per hour:

All terms

\$ 35.06

8-1556 Tm

Carpenter

10/01/2021

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:

07/01/2021

10/18/2021

Core Drilling:

Driller

\$ 41.74

\$ 42.27

Driller Helper

32.92

33.47

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:

Driller and Helper

\$ 29.40

\$ 30.60

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

10/01/2021

JOB DESCRIPTION Carpenter - Building / Heavy&Highway

DISTRICT 11

ENTIRE COUNTIES

Putnam, Rockland, Westchester

WAGES

WAGES:(per hour)

07/01/2021

BUILDING/HEAVY & HIGHWAY/TUNNEL:

Carpenter

Base Wage

\$ 37.69

+ \$7.63*

*For all hours paid straight or premium.

SHIFT DIFFERENTIAL: When it is mandated by a Government Agency irregular or off shift can be worked. The Carpenter shall receive an additional fifteen percent (15%) of wage plus applicable benefits.

NOTE: Carpenters employed in the removal or abatement of asbestos or any toxic or hazardous material or required to work near asbestos or any toxic or hazardous material and required to wear protective equipment shall receive two (2) hours extra pay per day, plus applicable supplemental benefits.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker

\$ 31.91

OVERTIME PAY

BUILDING:

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

HEAVY&HIGHWAY/TUNNEL:

See (B, E, P, *R, **T, X) on OVERTIME PAGE.

*R applies to Heavy&Highway/Tunnel Overtime Holiday Code 25 with benefits at straight time rate.

**T applies to Heavy&Highway/Tunnel Overtime Holiday Codes 5 & 6 with benefits at straight time rate.

HOLIDAY

BUILDING:

Paid: See (1) on HOLIDAY PAGE.

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

Holidays that fall on Sunday will be observed Monday.

HEAVY&HIGHWAY/TUNNEL:

Paid: See (5, 6, 25) on HOLIDAY PAGE including benefits.

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

REGISTERED APPRENTICES

1 year terms at the following wage rates:

Indentured before July 1 2016

1st	2nd	3rd	4th
\$ 18.85	\$ 22.61	\$ 26.38	\$ 30.15
+3.57*	+3.57*	+3.57*	+3.57*

Indentured after July 1 2016

1st	2nd	3rd	4th	5th
\$ 18.85	\$ 22.61	\$ 24.50	\$ 26.38	\$ 30.15
+3.57*	+3.57*	+3.57*	+3.57*	+3.57*

*For all hours paid straight or premium

SUPPLEMENTAL BENEFITS per hour:

All terms \$ 16.28

11-279.1B/HH

Electrician	10/01/2021
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JOB DESCRIPTION Electrician

DISTRICT 9

ENTIRE COUNTIES

Bronx, Kings, New York, Queens, Richmond, Westchester

WAGES

Per hour: 07/01/2021

Service Technician \$ 34.40

Service and Maintenance on Alarm and Security Systems.

Maintenance, repair and /or replacement of defective (or damaged) equipment on, but not limited to, Burglar - Fire - Security - CCTV - Card Access - Life Safety Systems and associated devices. (Whether by service contract of T&M by customer request.)

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker: \$ 19.32

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 11, 15, 16, 17, 25, 26) on HOLIDAY PAGE

Overtime: See (5, 6, 11, 15, 16, 17, 25, 26) on HOLIDAY PAGE

9-3H

Electrician	10/01/2021
--------------------	-------------------

JOB DESCRIPTION Electrician

DISTRICT 8

ENTIRE COUNTIES

Westchester

WAGES

Per hour: 07/01/2021 04/21/2022

*Electrician/A-Technician \$ 53.75 \$ 53.75

Teledata 53.75 53.75

*All new installations of wiring, conduit, junction boxes and light fixtures for projects with a base bid of more than \$325,000. For projects with a base bid of \$325,000 or less, see Maintenance and Repair rates.

Note: On a job where employees are required to work on bridges over navigable waters, transmission towers, light poles, bosun chairs, swinging scaffolds , etc. 40 feet or more above the water or ground or under compressed air, or tunnel projects under construction or where assisted breathing apparatus is required, they will be paid at the rate of time and one-half for such work except on normal pole line or building construction work.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker \$ 52.73 \$ 54.39

OVERTIME PAY

See (A, G, *J, P) on OVERTIME PAGE

*NOTE: Emergency work on Sunday and Holidays is at the time and one-half overtime rate.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

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

REGISTERED APPRENTICES

(1) year terms at the following wage rates:

	07/01/2021	01/01/2022	04/21/2022
1st term	\$ 14.00	\$ 15.00	\$ 15.00
2nd term	16.00	16.00	16.00
3rd term	18.00	18.00	18.00
4th term	20.00	20.00	20.00
MIJ 1-12 months	24.00	24.00	25.00
MIJ 13-18 months	27.50	27.50	28.50

Supplemental Benefits per hour:

	07/01/2021	04/21/2022
1st term	\$ 10.15	\$ 10.82
2nd term	13.05	13.05
3rd term	14.39	14.39
4th term	15.72	15.72
MIJ 1-12 months	13.39	13.49
MIJ 13-18 months	13.76	13.87

8-3/W

Electrician

10/01/2021

JOB DESCRIPTION Electrician

DISTRICT 8

ENTIRE COUNTIES

Westchester

WAGES

	07/01/2021	04/21/2022
Electrician -M	\$ 27.50	\$28.50
H - Telephone	\$ 27.50	\$28.50

All work with a base bid amount of \$325,000 or less. Including repairs and /or replacement of defective electrical and teledata equipment, all work necessary to retrofit, service, maintain and repair all kinds of lighting fixtures and local lighting controls, and washing and cleaning of foregoing fixtures.

*If the project exceeds \$375,000 due to changes in the scope of work, an Electrician/A Technician must be part of the labor ratio.

SUPPLEMENTAL BENEFITS

	07/01/2021	04/21/2022
Electrician &		
H - Telephone	\$ 13.76	\$13.87

OVERTIME PAY

See (B, G, *J, P) on OVERTIME PAGE

*Note: Emergency work on Sunday and Holidays is at the time and one-half overtime rate.

HOLIDAY

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

8-3m

Elevator Constructor

10/01/2021

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:		
	07/01/2021	03/17/2022
Elevator Constructor	\$ 72.29	\$ 75.14
Modernization & Service/Repair	56.77	59.09

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

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 will be liable for overtime payments for work over the allotted hours per day listed.

SUPPLEMENTAL BENEFITS

Per Hour:

Elevator Constructor	\$ 41.92	\$ 43.914
Modernization & Service/Repairs	41.082	42.787

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 Journeymans 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	\$ 34.05	\$ 34.772
2nd Term	34.91	35.606
3rd Term	36.30	37.052
4th Term	37.70	38.497

Modernization & Service/Repair

1st Term	\$ 34.00	\$ 34.672
2nd Term	34.50	35.195
3rd Term	35.83	36.571
4th Term	37.15	37.938

4-1

Elevator Constructor

10/01/2021

JOB DESCRIPTION Elevator Constructor

DISTRICT 1

ENTIRE COUNTIES

Columbia, Dutchess, Greene, Orange, Putnam, Sullivan, Ulster

PARTIAL COUNTIES

Delaware: Towns of Andes, Bovina, Colchester, Davenport, Delhi, Harpersfield, Hemdon, Kortright, Meredith, Middletown, Roxbury, Hancock & Stamford

Rockland: Only the Township of Stony Point.

Westchester: Only the Townships of Bedford, Lewisboro, Cortland, Mt. Kisco, North Salem, Pound Ridge, Somers and Yorktown.

WAGES

Per Hour	07/01/2021	01/01/2022
Mechanic	\$ 62.51	\$ 64.63
Helper	70% of Mechanic Wage Rate	70% of Mechanic Wage Rate

Four (4), ten (10) hour days may be worked for New Construction and Modernization Work at straight time during a week, Monday thru Thursday or Tuesday thru Friday.

***Four (4), ten (10) hour days are not permitted for Contract Work/Repair Work

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	07/01/2021	01/01/2022
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Journeyman/Helper	\$ 35.825*	\$ 36.885*
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(*)Plus 6% of regular hourly if less than 5 years of service. Plus 8% of regular hourly rate if more than 5 years of service.

OVERTIME PAY

See (D, O) on OVERTIME PAGE

HOLIDAY

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

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

Note: When a paid holiday falls on Saturday, it shall be observed on Friday. When a paid holiday falls on Sunday, it shall be observed on Monday.

REGISTERED APPRENTICES

Wages per hour:

0-6 mo*	6-12 mo	2nd yr	3rd yr	4th yr
50 %	55 %	65 %	70 %	80 %

(*)Plus 6% of the hourly rate, no additional supplemental benefits.

Supplemental Benefits per hour worked:

Same as Journeyman/Helper

1-138

Glazier	10/01/2021
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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:	7/01/2021	11/01/2021
Glazier	\$ 58.60	+ \$1.25
*Scaffolding	59.55	
Glass Tinting & Window Film	29.60	
**Repair & Maintenance	29.60	

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

**Repair & Maintenance- All repair & maintenance work on a particular building, whenever performed, where the total cumulative contract value is under \$148,837. All Glass tinting, window film, regardless of material or intended use, and all affixing of decals to windows or glass.

SUPPLEMENTAL BENEFITS

Per hour:	7/01/2021
Journeyworker	\$ 36.04
Glass tinting & Window Film	21.19
Repair & Maintenance	21.19

OVERTIME PAY

See (B,H,V) on OVERTIME PAGE.

For 'Repair & Maintenance' and 'Glass Tinting & Window Film' see (B, B2, I, S) on overtime page.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

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

For 'Repair & Maintenance' and 'Glass Tinting & Window Film' Only

Paid: See(5, 6, 16, 25)

Overtime: See(5, 6, 16, 25)

REGISTERED APPRENTICES

Wage per hour:

(1) year terms at the following wage rates:

	7/01/2021
1st term	\$ 20.72

2nd term	28.66
3rd term	34.67
4th term	46.62

Supplemental Benefits:

(Per hour)

1st term	\$ 16.58
2nd term	23.57
3rd term	26.09
4th term	30.91

8-1087 (DC9 NYC)

Insulator - Heat & Frost

10/01/2021

JOB DESCRIPTION Insulator - Heat & Frost

DISTRICT 8

ENTIRE COUNTIES

Dutchess, Orange, Putnam, Rockland, Westchester

WAGES

Per hour:	07/01/2021	05/31/2022
Insulator	\$ 56.25	+ \$ 2.00
Discomfort & Additional Training**	59.22	+ \$ 2.00
Fire Stop Work*	30.07	+ \$ 2.00

* Applies on all exclusive Fire Stop Work (When contract is for Fire Stop work only). No apprentices on these contracts only.

**Applies to work requiring: garb or equipment worn against the body not customarily worn by insulators; psychological evaluation; special training, including but not limited to "Yellow Badge" radiation training

Note: Additional \$0.50 per hour for work 30 feet or more above floor or ground level.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker	\$ 35.10
Discomfort & Additional Training	37.06
Fire Stop Work:	
Journeyworker	17.90

OVERTIME PAY

See (B, E, E2, Q, *T) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Note: Last working day preceding Christmas and New Years day, workers shall work no later than 12:00 noon and shall receive 8 hrs pay.

Overtime: See (2*, 4, 6, 16, 25) on HOLIDAY PAGE.

*Note: Labor Day triple time if worked.

REGISTERED APPRENTICES

(1) year terms:

Insulator Apprentices:

1st	2nd	3rd	4th
\$ 30.07	\$ 35.30	\$ 40.54	\$ 45.78

Discomfort & Additional Training Apprentices:

1st	2nd	3rd	4th
\$ 31.55	\$ 37.08	\$ 42.61	\$ 48.16

Supplemental Benefits paid per hour:

Insulator Apprentices:

1st term	\$ 17.90
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2nd term	21.35
3rd term	24.79
4th term	28.23

Discomfort & Additional Training Apprentices:

1st term	\$ 18.89
2nd term	22.52
3rd term	26.16
4th term	29.80

8-91

Ironworker	10/01/2021
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JOB DESCRIPTION Ironworker

DISTRICT 9

ENTIRE COUNTIES

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

WAGES

Per Hour: 07/01/2021

Ironworker Rigger \$ 67.99

Ironworker Stone
Derrickman \$ 67.99

SUPPLEMENTAL BENEFITS

Per hour: \$ 41.44

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 (18) 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
07/01/2021	\$33.55	\$47.94	\$53.34	\$58.74

Supplemental benefits:

Per hour:				
07/01/2021	\$21.18	\$31.45	\$31.45	\$31.45

9-197D/R

Ironworker	10/01/2021
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JOB DESCRIPTION Ironworker

DISTRICT 4

ENTIRE COUNTIES

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

WAGES

Per Hour:	07/01/2021	01/01/2022
		Additional
		\$ 1.25

Ornamental	\$ 46.15
Chain Link Fence	46.15
Guide Rail	46.15

SUPPLEMENTAL BENEFITS

Per hour:	
Journeyworker:	\$ 60.05

OVERTIME PAY

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

HOLIDAY

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

REGISTERED APPRENTICES

Apprentices hired before 8/31/2018:

(1/2) year terms at the following percentage of Journeyman's wage.

5th Term	80%
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Supplemental Benefits per hour:

5th Term	54.03
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Apprentices Hired after 9/1/18:

1 year terms

1st Term	\$ 20.63
2nd Term	24.22
3rd Term	27.80
4th Term	31.38

Supplemental Benefits per hour:

1st Term	\$ 17.89
2nd Term	19.14
3rd Term	20.40
4th Term	21.66

4-580-Or

Ironworker**10/01/2021****JOB DESCRIPTION** Ironworker**DISTRICT 4****ENTIRE COUNTIES**

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

WAGES

PER HOUR:

07/01/2021	01/01/2022
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Ironworker:

Structural	\$ 54.20	Additional \$ 1.75/Hr.
Bridges		
Machinery		

SUPPLEMENTAL BENEFITS

PER HOUR PAID:

Journeyman	\$ 82.35
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OVERTIME PAY

See (B, B1, Q, *V) on OVERTIME PAGE

*NOTE: Benefits are calculated for every hour paid

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	\$28.21
2nd	\$28.81
3rd - 6th	\$29.42

Supplemental Benefits

PER HOUR PAID:

All Terms	\$56.90
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4-40/361-Str

Ironworker**10/01/2021****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: 07/01/2021

Reinforcing &
Metal Lathing \$ 56.25

"Base" Wage \$ 54.70
plus \$ 1.55

"Base" Wage is used to calculate overtime hours only.

SUPPLEMENTAL BENEFITS

Per hour:
Reinforcing & Metal Lathing \$ 38.30

OVERTIME PAY

See (B, E, Q, *X) on OVERTIME PAGE

*Only \$22.00 per Hour for non worked hours

Supplemental Benefit Premiums for Overtime Hours worked:

Time & One Half \$ 45.08
Double Time \$ 51.33

HOLIDAY

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

REGISTERED APPRENTICES

(1) year terms at the following wage rates:

1st term	2nd term	3rd term	4th Term
Wage Per Hour: \$ 22.55	\$ 28.38	\$ 34.68	\$ 37.18
"Base" Wage \$ 21.00 plus \$1.55	\$ 26.80 plus \$1.58	\$ 33.10 plus \$1.58	\$ 35.60 plus \$1.58

"Base" Wage is used to calculate overtime hours ONLY.

SUPPLEMENTAL BENIFITS

Per Hour:

1st term	2nd term	3rd term	4th Term
\$ 18.17	\$ 21.34	\$ 22.00	\$ 20.50

4-46Reinf

Laborer - Building

10/01/2021

JOB DESCRIPTION Laborer - Building

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

WAGES

07/01/2021

Laborer \$ 36.40
plus \$5.05**

Laborer - Asbestos & Hazardous
Materials Removal \$ 43.10*

* Abatement/Removal of:

- Lead based or lead containing paint on materials to be repainted is classified as Painter.
- Asbestos containing roofs and roofing material is classified as Roofer.

** This portion is not subject to overtime premium.

NOTE: Upgrade/Material condition work plan for work performed during non-outage under a wage formula of 90% wage/100% fringe benefits at nuclear power plants.

SUPPLEMENTAL BENEFITS

Per hour: 07/01/2021

Journeyworker \$ 27.50

OVERTIME PAY

See (B, E, E2, Q, *V) on OVERTIME PAGE

*Note: For Sundays and Holidays worked benefits are at the same premium as wages.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

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

REGISTERED APPRENTICES

LABORER ONLY

Hourly terms at the following wage:

Level A	Level B	Level C	Level D
0-1000	1001-2000	2001-3000	3001-4000
\$ 21.04	\$ 24.86	\$ 28.69	\$ 32.51

Supplemental Benefits per hour:

Apprentices
All terms \$ 21.15

8-235/B

Laborer - Heavy&Highway

10/01/2021

JOB DESCRIPTION Laborer - Heavy&Highway

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

WAGES

PUTNAM: APPLIES TO ALL HEAVY & HIGHWAY WORK EXCLUDING HIGHWAYS, STREETS, AND BRIDGES

GROUP I: Blaster, Quarry Master, Curbs/Asphalt Screedman, Pipe Jacking and Boring Operations Operator, Qualified Dead Condition Pipe Fuser (B Mechanic)

GROUP II: Burner, Drillers(jumbo, joy, wagon, air track, hydraulic), Drill Operator, Self Contained Rotary Drill, Curbs, Raker, Bar Person, Concrete Finisher.

GROUP III: Pavement Breakers, Jeep Operator, Jack Hammer, Pneumatic Tools (all), Gas Driller, Guniting, Railroad Spike Puller, Pipelayer, Chain Saw, Deck winches on scows, Power Buggy Operator, Power Wheelbarrow Operator, Bar Person Helper, Compressed Air lance, Water Jet Lance.

GROUP IV: Concrete Laborers, Asph. Worker, Rock Scaler, Vibrator Oper., Bit Grinder, Air Tamper, Pumps, Epoxy (adhesives, fillers and troweled on), Barco Rammer, Concrete Grinder, Crack Router Operator, Guide Rail-digging holes and placing concrete and demolition when not to be replaced, distribution of materials and tightening of bolts.

GROUP V: Drillers Helpers, Common Laborer, Mason Tenders, Signal Person, Pit Person, Truck Spotter, Powder Person, Landscape/Nursery Person, Dump Person, Temp. Heat.

GROUP VIA: Asbestos/Toxic Waste Laborer-All removal (Roads, Tunnels, Landfills, etc.) Confined space laborer, Bio-remediation, Phyto-remediation, Lead or Hazardous material, Abatement Laborer.

Wages:(per hour) 07/01/2021

GROUP I	\$45.65*
GROUP II	44.30*
GROUP III	43.90*
GROUP IV	43.55*

GROUP V	43.20*
GROUP VIA	45.20*
Operator Qualified	
Gas Mechanic(A Mech)	55.65*
Flagperson	36.85*

*NOTE: To calculate overtime premiums, deduct \$0.10 from above wages

SHIFT WORK: A shift premium will be paid on Public Work contracts for off-shift or irregular shift work when mandated by the NYS D.O.T. or other Governmental Agency contracts. Employees shall receive an additional 15% per hour above current rate for all regular and irregular shift work. Premium pay shall be calculated using the 15% per hour differential as base rate.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker:

First 40 Hours

Per Hour \$26.10

Over 40 Hours

Per Hour 19.85

OVERTIME PAY

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

HOLIDAY

Paid: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE

Overtime: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE

NOTE: For Holiday Overtime: 5, 6 - Code 'S' applies

For Holiday Overtime: 8, 15, 25, 26 - Code 'R' applies

REGISTERED APPRENTICES

	1st term	2nd term	3rd term	4th term
	1-1000hrs	1001-2000hrs	2001-3000hrs	3001-4000hrs
07/01/2021	\$ 24.56	\$ 28.98	\$ 33.40	\$ 37.72

Supplemental Benefits per hour:

1st term	\$ 4.70 - After 40 hours: \$ 4.45
2nd term	\$ 4.80 - After 40 hours: \$ 4.45
3rd term	\$ 5.30 - After 40 hours: \$ 4.85
4th term	\$ 5.85 - After 40 hours: \$ 5.35

8-60H/H

Laborer - Tunnel

10/01/2021

JOB DESCRIPTION Laborer - Tunnel

DISTRICT 11

ENTIRE COUNTIES

Columbia, Dutchess, Greene, Orange, Otsego, Putnam, Rockland, Sullivan, Ulster, Westchester

PARTIAL COUNTIES

Chenango: Townships of Columbus, Sherburne and New Berlin.

Delaware: Townships of Andes, Bovina, Middletown, Roxbury, Franklin, Hamden, Stamford, Delhi, Kortright, Harpersfield, Merideth and Davenport.

WAGES

Class 1: All support laborers/sandhogs working above the shaft or tunnel.

Class 2: All laborers/sandhogs working in the shaft or tunnel.

Class 4: Safety Miners

Class 5: Site work related to Shaft/Tunnel

WAGES: (per hour)

	07/01/2021	07/01/2022
Class 1	\$ 51.95	\$ 53.45
Class 2	54.10	55.60
Class 4	60.50	62.00
Class 5	43.50	44.80

Toxic and hazardous waste, lead abatement and asbestos abatement work will be paid an additional \$ 3.00 an hour.

SHIFT DIFFERENTIAL...On all Government mandated irregular shift work:

- Employee shall be paid at time and one half the regular rate Monday through Friday.
- Saturday shall be paid at 1.65 times the regular rate.
- Sunday shall be paid at 2.15 times the regular rate.

SUPPLEMENTAL BENEFITS

Per hour:

Benefit 1	\$ 33.25	\$ 34.45
Benefit 2	49.81	51.60
Benefit 3	66.35	68.75

Benefit 1 applies to straight time hours, paid holidays not worked.

Benefit 2 applies to over 8 hours in a day (M-F), irregular shift work hours worked, and Saturday hours worked.

Benefit 3 applies to Sunday and Holiday hours worked.

OVERTIME PAY

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

HOLIDAY

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

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

When a recognized Holidays falls on Saturday or Sunday, holidays falling on Saturday shall be recognized or observed on Friday and holidays falling on Sunday shall be recognized or observed on Monday. Employees ordered to work on the Saturday or Sunday of the holiday or on the recognized or the observed Friday or Monday for those holidays falling on Saturday or Sunday shall receive double time the established rate and benefits for the holiday.

REGISTERED APPRENTICES

FOR APPRENTICE RATES, refer to the appropriate Laborer Heavy & Highway wage rate contained in the wage schedule for the County and location where the work is to be performed.

11-17/60/235/754Tun

Lineman Electrician

10/01/2021

JOB DESCRIPTION Lineman Electrician

DISTRICT 6

ENTIRE COUNTIES

Westchester

WAGES

Below rates apply to electrical overhead and underground distribution and maintenance work and overhead and underground transmission line work, electrical substations, switching structures, continuous pipe-type underground fluid or gas filled transmission conduit and cable installations, maintenance jobs or projects, railroad catenary installations and maintenance, third rail installations, the bonding of rails and the installation of fiber optic cable. (Ref #14.04.01)

Includes Teledata Work performed within ten (10) feet of high voltage (600 volts or over) transmission lines.

Per hour:	07/01/2021	05/02/2022	05/01/2023	05/06/2024
Lineman, Tech, Welder	\$ 57.71	\$ 59.01	\$ 60.41	\$ 61.91
Crane, Crawler Backhoe	57.71	59.01	60.41	61.91
Cable Splicer-Pipe Type	63.48	64.91	66.45	68.10
Digging Mach Operator	51.94	53.11	54.37	55.72
Cert. Welder-Pipe Type	60.60	61.96	63.43	65.01
Tractor Trailer Driver	49.05	50.16	51.35	52.62
Groundman, Truck Driver	46.17	47.21	48.33	49.53
Equipment Mechanic	46.17	47.21	48.33	49.53
Flagman	34.63	35.41	36.25	37.15

Additional \$1.00 per hour for entire crew when a helicopter is used.

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED BETWEEN THE HOURS LISTED BELOW:

1ST SHIFT	8:00 AM TO 4:30 PM REGULAR RATE
2ND SHIFT	4:30 PM TO 1:00 AM REGULAR RATE PLUS 17.3%
3RD SHIFT	12:30 AM TO 9:00 AM REGULAR RATE PLUS 31.4%

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. Tuesday thru Friday may be worked with no 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 worked (but also required on non-worked holidays):

	\$25.40 *plus 7% of hourly Wage	\$ 25.90 *plus 7% of hourly wage	\$ 26.40 *plus 7% of hourly wage	\$ 26.90 *plus 7% of hourly wage
Journeyman Lineman or Equipment Operators with Crane License	\$ 26.40 *plus 7% of hourly wage	\$ 27.90 *plus 7% of hourly wage	\$ 29.40 *plus 7% of hourly wage	\$ 30.90 *plus 7% of hourly wage

*The 7% is based on the hourly wage paid, straight time or premium time.

OVERTIME PAY

See (B, E, Q,) on OVERTIME PAGE. *Note* Double time for emergency work designated by the Dept of Jurisdiction.

NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked.
Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY

Paid See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.
Overtime See (5, 6, 8, 13, 25) on HOLIDAY PAGE plus Governor of NYS Election Day.

NOTE: All paid holidays falling on Saturday shall be observed on the preceding Friday. All paid holidays falling on Sunday shall be observed on the following Monday. Supplements for holidays paid at straight time.

REGISTERED APPRENTICES

WAGES per hour: 1000 hour terms at the following percentage of the applicable Journeyman Lineman wage.

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

SUPPLEMENTAL BENEFITS per hour:

07/01/2021	05/02/2022	05/01/2023	05/06/2024
\$25.40 *plus 7% of hourly Wage	\$ 25.90 *plus 7% of hourly wage	\$ 26.40 *plus 7% of hourly wage	\$ 26.90 *plus 7% of hourly wage

*The 7% is based on the hourly wage paid, straight time or premium time.

6-1249aWest

Lineman Electrician - Teledata

10/01/2021

JOB DESCRIPTION Lineman Electrician - Teledata

DISTRICT 6

ENTIRE COUNTIES

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

WAGES

Per hour:

For outside work, stopping at first point of attachment (demarcation).

07/01/2021

Cable Splicer	\$ 34.78
Installer, Repairman	\$ 33.01
Teledata Lineman	\$ 33.01
Tech., Equip. Operator	\$ 33.01
Groundman	\$ 17.50

NOTE: EXCLUDES Teledata work within ten (10) feet of High Voltage (600 volts and over) transmission lines. For this work please see LINEMAN.

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED:

1ST SHIFT

REGULAR RATE

2ND SHIFT REGULAR RATE PLUS 10%
3RD SHIFT REGULAR RATE PLUS 15%

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman

\$ 5.14
*plus 3% of
wage paid

*The 3% is based on the hourly wage paid, straight time rate or premium rate.

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked.
Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY

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

6-1249LT - Teledata

Lineman Electrician - Traffic Signal, Lighting

10/01/2021

JOB DESCRIPTION Lineman Electrician - Traffic Signal, Lighting

DISTRICT 6

ENTIRE COUNTIES

Westchester

WAGES

Lineman/Technician shall perform all overhead aerial work. A Lineman/Technician on the ground will install all electrical panels, connect all grounds, install and connect all electrical conductors which includes, but is not limited to road loop wires; conduit and plastic or other type pipes that carry conductors, flex cables and connectors, and to oversee the encasement or burial of such conduits or pipes.

A Groundman/Groundman Truck Driver shall: Build and set concrete forms, handle steel mesh, set footer cages, transport concrete in a wheelbarrow, hand or machine concrete vibrator, finish concrete footers, mix mortar, grout pole bases, cover and maintain footers while curing in cold weather, operate jack hammer, operate hand pavement breaker, tamper, concrete and other motorized saws, as a drill helper, operate and maintain generators, water pumps, chainsaws, sand blasting, operate mulching and seeding machine, air tools, electric tools, gas tools, load and unload materials, hand shovel and/or broom, prepare and pour mastic and other fillers, assist digger operator equipment operator in ground excavation and restoration, landscape work and painting. Only when assisting a lineman technician, a groundman/truck driver may assist in installing conduit, pipe, cables and equipment.

A flagger's duties shall consist of traffic control only.
(Ref #14.01.03)

Per hour:	07/01/2021	05/02/2022	05/01/2023	05/06/2024
Lineman, Technician	\$ 52.56	\$ 53.60	\$ 54.73	\$ 55.95
Crane, Crawler Backhoe	52.56	53.60	54.73	55.95
Certified Welder	55.19	56.28	57.47	58.75
Digging Machine	47.30	48.24	49.26	50.36
Tractor Trailer Driver	44.68	45.56	46.52	47.56
Groundman, Truck Driver	42.05	42.88	43.78	44.76
Equipment Mechanic	42.05	42.88	43.78	44.76
Flagman	31.54	32.16	32.84	33.57

Above rates are applicable for installation, testing, operation, maintenance and repair on all Traffic Control (Signal) and Illumination (Lighting) projects, Traffic Monitoring Systems, and Road Weather Information Systems. Includes digging of holes for poles, anchors, footer foundations for electrical equipment; assembly of all electrical materials or raceway; placing of fish wire; pulling of cables, wires or fiber optic cable through such raceways; splicing of conductors; dismantling of such structures, lines or equipment.

NOTE: THE FOLLOWING RATES WILL APPLY ON ALL CONTRACTING AGENCY MANDATED MULTIPLE SHIFTS OF AT LEAST FIVE (5) DAYS DURATION WORKED BETWEEN THE HOURS LISTED BELOW:

1ST SHIFT 8:00 AM TO 4:30 PM REGULAR RATE
2ND SHIFT 4:30 PM TO 1:00 AM REGULAR RATE PLUS 17.3%
3RD SHIFT 12:30 AM TO 9:00 AM REGULAR RATE PLUS 31.4%

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. Tuesday thru Friday may be worked with no 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 worked (but also required on non-worked holidays):

	\$25.40 *plus 7% of hourly Wage	\$ 25.90 *plus 7% of hourly wage	\$ 26.40 *plus 7% of hourly wage	\$ 26.90 *plus 7% of hourly wage
Journeyman Lineman or Equipment Operators with Crane License	\$ 26.40 *plus 7% of hourly wage	\$ 27.90 *plus 7% of hourly wage	\$ 29.40 *plus 7% of hourly wage	\$ 30.90 *plus 7% of hourly wage

*The 7% is based on the hourly wage paid, straight time or premium time.

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE. *Note* Double time for emergency work designated by the Dept. of Jurisdiction.

NOTE: WAGE CAP - Double the straight time hourly base wage shall be the maximum hourly wage compensation for any hour worked.

Contractor is still responsible to pay the hourly benefit amount for each hour worked.

HOLIDAY

Paid: See (5, 6, 8, 13, 25) on HOLIDAY PAGE and Governor of NYS Election Day.

Overtime: See (5, 6, 8, 13, 25) on HOLIDAY PAGE and Governor of NYS Election Day.

NOTE: All paid holidays falling on Saturday shall be observed on the preceding Friday. All paid holidays falling on Sunday shall be observed on the following Monday. Supplements for holidays paid at straight time.

REGISTERED APPRENTICES

WAGES per hour: 1000 hour terms at the following percentage of the applicable Journeyman Lineman wage.

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

SUPPLEMENTAL BENEFITS per hour:

07/01/2021	05/02/2022	05/01/2023	05/06/2024
\$25.40 *plus 7% of hourly Wage	\$ 25.90 *plus 7% of hourly wage	\$ 26.40 *plus 7% of hourly wage	\$ 26.90 *plus 7% of hourly wage

*The 7% is based on the hourly wage paid, straight time or premium time.

6-1249aWestLT

Mason - Building

10/01/2021

JOB DESCRIPTION Mason - Building

DISTRICT 9

ENTIRE COUNTIES

Nassau, Rockland, Suffolk, Westchester

WAGES

Per hour:	07/01/2021	12/06/2021	06/06/2022
		Additional	Additional
Tile Setters	\$ 61.07	\$ 0.48	\$ 0.72

SUPPLEMENTAL BENEFITS

Per Hour:	\$ 24.91*
	+ \$10.01

* This portion of benefits subject to same premium rate as shown for overtime wages.

OVERTIME PAY

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

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	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	6001-6750	6501-7000
07/01/2021	\$20.84	\$25.66	\$32.68	\$37.50	\$40.99	\$44.30	\$47.82	\$52.63	\$55.35	\$59.34

Supplemental Benefits per hour:

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$12.55*	\$12.55*	\$15.16*	\$15.16*	\$16.16*	\$17.66*	\$18.66*	\$18.66*	\$16.66*	\$21.91*
+\$0.66	+\$0.71	+\$0.81	+\$0.85	+\$1.23	+\$1.28	+\$1.63	+\$1.68	+\$5.83	+\$6.32

* This portion of benefits subject to same premium rate as shown for overtime wages.

9-7/52A

Mason - Building	10/01/2021
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JOB DESCRIPTION Mason - Building

DISTRICT 11

ENTIRE COUNTIES

Putnam, Rockland, Westchester

PARTIAL COUNTIES

Orange: Only the Township of Tuxedo.

WAGES

Per hour:

	07/01/2021	06/01/2022 Additional	06/01/2023 Additional
Bricklayer	\$ 43.35	\$ 2.39	\$ 2.05
Cement Mason	43.35	2.39	2.05
Plasterer/Stone Mason	43.35	2.39	2.05
Pointer/Caulker	43.35	2.39	2.05

Additional \$1.00 per hour for power saw work

Additional \$0.50 per hour for swing scaffold or staging work

SHIFT WORK: When shift work or an irregular work day is mandated or required by state, federal, county, local or other governmental agency contracts, the following premiums apply:

Irregular work day requires 15% premium

Second shift an additional 15% of wage plus benefits to be paid

Third shift an additional 25% of wage plus benefits to be paid

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 36.05.

OVERTIME PAY

OVERTIME:

Cement Mason See (B, E, Q, W) on OVERTIME PAGE.

All Others See (B, E, Q) on OVERTIME PAGE.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

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

Whenever any of the above holidays fall on Sunday, they will be observed on Monday. Whenever any of the above holidays fall on Saturday, they will be observed on Friday.

REGISTERED APPRENTICES

Wages per hour:

750 hour terms at the following percentage of Journeyman's wage

1st	2nd	3rd	4th	5th	6th	7th	8th
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50% 55% 60% 65% 70% 75% 80% 85%

Supplemental Benefits per hour

750 hour terms at the following percentage of journeyman supplements

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Apprentices indentured before June 1st, 2011 receive full journeyman benefits

11-5wp-b

Mason - Building

10/01/2021

JOB DESCRIPTION Mason - Building

DISTRICT 9

ENTIRE COUNTIES

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

WAGES

Building

07/01/2021

01/01/2022

Wages per hour:

Mosaic & Terrazzo Mechanic

\$ 58.46

Additional
\$ 0.85

Mosaic & Terrazzo Finisher

\$ 56.86

SUPPLEMENTAL BENEFITS

Per hour:

Mosaic & Terrazzo Mechanic

\$ 26.11*
+ \$11.73

Mosaic & Terrazzo Finisher

\$ 26.11*
+ \$11.71

*This portion of benefits subject to same premium rate as shown for overtime wages.

OVERTIME PAY

See (A, E, Q) on OVERTIME PAGE

Deduct \$6.80 from hourly wages before calculating overtime.

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
07/01/2021	\$ 25.82	\$ 28.40	\$ 31.00	\$ 33.58	\$ 36.16	\$ 38.74	\$ 43.91	\$ 49.08

Supplemental benefits per hour:

	1st	2nd	3rd	4th	5th	6th	7th	8th
07/01/2021	\$13.06* +\$9.27	\$14.37* +\$10.19	\$15.67* +\$11.12	\$16.98* +\$12.04	\$18.28* +\$12.97	\$19.59* +\$13.90	\$22.20* +\$15.75	\$24.81* +\$17.60

Apprentices hired after 07/01/2017:

Wages Per hour:

1st	2nd	3rd	4th	5th	6th
0- 1500	1501- 3000	3001- 3750	3751- 4500	4501- 5250	5251- 6000

07/01/2021	\$ 22.63	\$ 29.10	\$ 31.00	\$ 36.16	\$ 41.32	\$ 46.48
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Supplemental Benefits per hour:

	1st	2nd	3rd	4th	5th	6th
07/01/2021	\$4.59*	\$5.90*	\$15.67*	\$18.28*	\$20.89*	\$23.50*
	+\$6.49	+\$8.34	+\$11.12	+\$12.97	+\$14.83	+\$16.67

*This portion of benefits subject to same premium rate as shown for overtime wages.

9-7/3

Mason - Building	10/01/2021
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JOB DESCRIPTION Mason - Building

DISTRICT 9

ENTIRE COUNTIES

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

WAGES

Per hour: 07/01/2021 01/01/2022

Building-Marble Restoration: Additional

Marble, Stone & Terrazzo Polisher, etc \$ 46.16 \$ 1.10

SUPPLEMENTAL BENEFITS

Per Hour:

Journeyworker:

Building-Marble Restoration:

Marble, Stone & Polisher \$ 29.11

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 term at the following wage:

	1st 1- 900	2nd 901- 1800	3rd 1801- 2700	4th 2701
07/01/2021	\$32.28	\$36.91	\$41.51	\$46.16

Supplemental Benefits Per Hour:

07/01/2021	\$26.47	\$27.34	\$28.29	\$29.11
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9-7/24-MP

Mason - Building	10/01/2021
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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: 07/01/2021 01/03/2022

Marble Cutters & Setters \$ 61.73 \$ 0.95

SUPPLEMENTAL BENEFITS

Per Hour:

Journeyworker \$ 37.76

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
\$ 24.70	\$ 27.77	\$ 30.87	\$ 33.94	\$ 37.03	\$ 40.11	\$ 43.20	\$ 46.29	\$ 52.46	\$ 58.64

Supplemental Benefits per hour:

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$ 20.01	\$ 21.43	\$ 22.83	\$ 24.25	\$ 25.65	\$ 27.07	\$ 28.47	\$ 29.88	\$ 32.70	\$ 35.51

9-7/4

Mason - Building

10/01/2021

JOB DESCRIPTION Mason - Building

DISTRICT 9

ENTIRE COUNTIES

Nassau, Rockland, Suffolk, Westchester

WAGES

Per hour:	07/01/2021	12/06/2021	06/06/2022
Tile Finisher	\$ 46.89	Additional \$ 0.39	Additional \$ 0.58

SUPPLEMENTAL BENEFITS

Per Hour:

\$ 21.91*
+ \$9.84

*This portion of benefits subject to same premium rate as shown for overtime wages

OVERTIME PAY

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

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

10/01/2021

JOB DESCRIPTION Mason - Building

DISTRICT 9

ENTIRE COUNTIES

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

WAGES

Per hour:	07/01/2021	01/01/2022
Marble, Stone, etc. Maintenance Finishers:	\$ 26.73	Additional \$ 0.68

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: \$ 14.00

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:

07/01/2021

0-750	\$21.37
751-1500	\$22.09
1501-2250	\$22.81
2251-3000	\$23.52
3001-3750	\$24.61
3751-4500	\$26.04
4501+	\$26.73

Supplemental Benefits:

Per hour:

0-750	\$ 11.24
751-1500	\$ 11.60
1501-2250	\$ 11.97
2251-3000	\$ 12.35
3001-3750	\$ 12.84
3751-4500	\$ 13.63
4501+	\$ 14.00

9-7/24M-MF

Mason - Building / Heavy&Highway

10/01/2021

JOB DESCRIPTION Mason - Building / Heavy&Highway

DISTRICT 9

ENTIRE COUNTIES

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

WAGES

Per hour: 07/01/2021 01/03/2022

Marble-Finisher	\$ 48.87	Additional \$ 0.61
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SUPPLEMENTAL BENEFITS

Journeyworker:
per hour

Marble- Finisher \$ 35.25

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 - Heavy&Highway

10/01/2021

JOB DESCRIPTION Mason - Heavy&Highway

DISTRICT 11

ENTIRE COUNTIES

Putnam, Rockland, Westchester

PARTIAL COUNTIES

Orange: Only the Township of Tuxedo.

WAGES

Per hour:

	07/01/2021	06/01/2022 Additional	06/01/2023 Additional
Bricklayer	\$ 43.85	\$ 2.39	\$ 2.05
Cement Mason	43.85	2.39	2.05
Marble/Stone Mason	43.85	2.39	2.05
Plasterer	43.85	2.39	2.05
Pointer/Caulker	43.85	2.39	2.05

Additional \$1.00 per hour for power saw work

Additional \$0.50 per hour for swing scaffold or staging work

SHIFT WORK: When shift work or an irregular work day is mandated or required by state, federal, county, local or other governmental contracts, the following rates apply:

Irregular work day requires 15% premium

Second shift an additional 15% of wage plus benefits to be paid

Third shift an additional 25% of wage plus benefits to be paid

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 36.05

OVERTIME PAY

Cement Mason See (B, E, Q, W, X)

All Others See (B, E, Q, X)

HOLIDAY

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

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

Whenever any of the above holidays fall on Sunday, they will be observed on Monday. Whenever any of the above holidays fall on Saturday, they will be observed on Friday.

REGISTERED APPRENTICES

Wages per hour:

750 hour terms at the following percentage of Journeyman's wage

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Supplemental Benefits per hour

750 hour terms at the following percentage of journeyman supplements

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	85%

Apprentices indentured before June 1st, 2011 receive full journeyman benefits

11-5WP-H/H

Operating Engineer - Building

10/01/2021

JOB DESCRIPTION Operating Engineer - Building

DISTRICT 9

ENTIRE COUNTIES

Bronx, Kings, New York, Putnam, Queens, Richmond, Westchester

PARTIAL COUNTIES

Dutchess: that part of Dutchess County lying south of the North City Line of the City of Poughkeepsie.

WAGES

NOTE:Construction surveying

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 assists the Survey Crew

Wages:(Per Hour)

07/01/2021

Building Construction:

Party Chief	\$ 76.09
Instrument Man	\$ 60.41
Rodman	\$ 41.11

Steel Erection:

Party Chief	\$ 79.02
Instrument Man	\$ 62.89
Rodman	\$ 44.03

**Heavy Construction-NYC counties only:
(Foundation, Excavation.)**

Party Chief	\$ 84.60
Instrument man	\$ 63.79
Rodman	\$ 54.52

SUPPLEMENTAL BENEFITS

Per Hour:	07/01/2021
Building Construction	\$ 24.40* +\$ 7.15
Steel Erection	\$ 25.00* +\$ 7.15
Heavy Construction	\$ 25.25* +\$ 7.15

* This portion subject to same premium as wages

Non-Worked Holiday Supplemental Benefit:	\$ 16.45
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OVERTIME PAY

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

Code "A" applies to Building Construction and has double the rate after 7 hours on Saturdays.

Code "B" applies to Heavy Construction and Steel Erection and had double the rate after 8 hours on Saturdays.

HOLIDAY

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

9-15Db

Operating Engineer - Building

10/01/2021

JOB DESCRIPTION Operating Engineer - Building

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

PARTIAL COUNTIES

Dutchess: All the counties of Westchester and Putnam and the southern part of Dutchess County defined by the northern boundary line of the City of Poughkeepsie, then due east to Route 115, then north along Route 115 to Bedell Road, then east along Bedell Road to Van Wagner Road, then north along Van Wagner Road to Bower Road, then east along Bower Road to Route 44 and along Route 44 east to Route 343, then along Route 343 east to the northern boundary of Town of Dover Plains and east along the northern boundary of Town of Dover Plains to the border line of the State of Connecticut and bordered on the west by the middle of the Hudson River.

WAGES

GROUP I:

Cranes (All Types up to 49 tons), Boom Trucks, Cherry Pickers (All Types), Clamshell Crane, Derrick (Stone and Steel), Dragline, Franki Pile Rig or similar, High Lift (Lull or similar) with crane attachment and winch used for hoisting or lifting, Hydraulic Cranes, Pile Drivers, Potain and similar.

Cranes (All types 50-99 tons), Drill Rig Casa Grande (CAT or similar), Franki Pile Rig or similar, Hydraulic Cranes (All types including Crawler Cranes- No specific boom length).

Cranes (All types 100 tons and over), All Tower Cranes, All Climbing Cranes irrespective of manufacturer and regardless of how the same is rigged, Franki Pile Rig or similar, Conventional Cranes (All types including Crawler Cranes-No specific boom length), Hydraulic Cranes.

GROUP I-A: Barber Green Loader-Euclid Loader, Bulldozer, Carrier-Trailer Horse, Concrete Cleaning Decontamination Machine Operator, Concrete-Portable Hoist, Conway or Similar Mucking Machines, Elevator & Cage, Excavators all types, Front End Loaders, Gradall, Shovel, Backhoe, etc. (Crawler or Truck), Heavy Equipment Robotics Operator/Mechanic, Hoist Engineer-Material, Hoist Portable Mobile Unit, Hoist (Single, Double or Triple Drum), Horizontal Directional Drill Locator, Horizontal Directional Drill Operator and Jersey Spreader, Letourneau or Tournapull (Scrapers over 20 yards Struck), Lift Slab Console, etc., Lull HiLift or Similar, Master Environmental Maintenance Mechanics, Mucking Machines Operator/Mechanic or Similar Type, Overhead Crane, Pavement Breaker (Air Ram), Paver (Concrete), Post Hole Digger, Power House Plant, Road Boring Machine, Road Mix Machine, Ross Carrier and Similar Machines, Rubber tire double end backhoes and similar machines, Scoopmobile Tractor-Shovel Over 1.5 yards, Shovel (Tunnels), Spreader (Asphalt) Telephie (Cableway), Tractor Type Demolition Equipment, Trenching Machines-Vermeer Concrete Saw Trencher and Similar, Ultra High Pressure Waterjet Cutting Tool System, Vacuum Blasting Machine operator/mechanic, Winch Truck A Frame.

GROUP I-B: Compressor (Steel Erection), Mechanic (Outside All Types), Negative Air Machine (Asbestos Removal), Push Button (Buzz Box) Elevator.

GROUP II: Compactor Self-Propelled, Concrete Pump, Crane Operator in Training (Over 100 Tons), Grader, Machines Pulling Sheep's Foot Roller, Roller (4 ton and over), Scrapers (20 yards Struck and Under), Vibratory Rollers, Welder.

GROUP III-A: Asphalt Plant, Concrete Mixing Plants, Forklift (All power sources), Joy Drill or similar, Tractor Drilling Machine, Loader (1 1/2 yards and under), Portable Asphalt Plant, Portable Batch Plant, Portable Crusher, Skid Steer (Bobcat or similar), Stone Crusher, Well Drilling Machine, Well Point System.

GROUP III-B: Compressor Over 125 cu. Feet, Conveyor Belt Machine regardless of size, Compressor Plant, Ladder Hoist, Stud Machine.

GROUP IV-A: Batch Plant, Concrete Breaker, Concrete Spreader, Curb Cutter Machine, Finishing Machine-Concrete, Fine Grading Machine, Hepa Vac Clean Air Machine, Material Hopper (sand, stone, cement), Mulching Grass Spreader, Pump Gypsum etc, Pump-Plaster-Grout-Fireproofing. Roller (Under 4 Ton), Spreading and Fine Grading Machine, Steel Cutting Machine, Siphon Pump, Tar Joint Machine, Television Cameras for Water, Sewer, Gas etc. Turbo Jet Burner or Similar Equipment, Vibrator (1 to 5).

GROUP IV-B: Compressor (all types), Heater (All Types), Fire Watchman, Lighting Unit (Portable & Generator) Pump, Pump Station (Water, Sewer, Portable, Temporary), Welding Machine (Steel Erection & Excavation).

GROUP V: Mechanics Helper, Motorized Roller (walk behind), Stock Attendant, Welder's Helper, Maintenance Engineer Crane (75 ton and over).

Group VI-A: Welder Certified

GROUP VI-B: Utility Man, Warehouse Man.

WAGES: (per hour)

	07/01/2021	3/7/2022	3/6/2023
GROUP I			
Cranes- up to 49 tons	\$ 63.86	\$ 65.03	\$ 66.23
Cranes- 50 tons to 99 tons	66.07	67.28	68.53
Cranes- 100 tons and over	75.37	76.77	78.21
GROUP I-A	55.96	56.97	58.01
GROUP I-B	51.60	52.52	53.48
GROUP II	54.00	54.98	55.70
GROUP III-A	52.04	52.97	53.94
GROUP III-B	49.56	50.44	51.35
GROUP IV-A	51.52	52.44	53.40
GROUP IV-B	43.62	44.38	45.17
GROUP V	47.00	47.83	48.69
Group VI-A	54.94	55.93	56.96
GROUP VI-B			
Utility Man	44.61	45.39	46.21
Warehouse Man	46.74	47.57	48.42

An additional 20% to wage when required to wear protective equipment on hazardous/toxic waste projects.

Engineers operating cranes with booms 100 feet but less than 149 feet in length will be paid an additional \$2.00 per hour.

Engineers operating cranes with booms 149 feet or over in length will be paid an additional \$3.00 per hour.

Loader operators over 5 cubic yard capacity additional .50 per hour.

Shovel operators over 4 cubic yard capacity additional \$1.00 per hour.

SUPPLEMENTAL BENEFITS

Per hour:

	07/01/2021	03/07/2022	03/06/2023
Journeyworker	\$ 29.17	\$ 29.87	\$ 30.57

OVERTIME PAY

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

HOLIDAY

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

8-137B

Operating Engineer - Heavy&Highway

10/01/2021

JOB DESCRIPTION Operating Engineer - Heavy&Highway

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

PARTIAL COUNTIES

Dutchess: All the counties of Westchester and Putnam and the southern part of Dutchess County defined by the northern boundary line of the City of Poughkeepsie, then due east to Route 115, then north along Route 115 to Bedell Road, then east along Bedell Road to Van Wagner Road, then north along Van Wagner Road to Bower Road, then east along Bower Road to Route 44 and along Route 44 east to Route 343, then along Route 343 east to the northern boundary of Town of Dover Plains and east along the northern boundary of Town of Dover Plains to the border line of the State of Connecticut and bordered on the west by the middle of the Hudson River.

WAGES

GROUP I: Boom Truck, Cherry Picker, Clamshell, Crane, (Crawler, Truck),
Dragline, Drill Rig (Casa Grande, Cat, or Similar), Floating Crane (Crane on Barges) under 100 tons, Gin Pole, Hoist Engineer-Concrete (Crane-Derrick-Mine Hoist), Knuckle Boom Crane, Rough Terrain Crane.

GROUP I-A: Auger (Truck or Truck Mounted), Boat Captain, Bulldozer-All Sizes, Central Mix Plant Operator, Chipper (all types), Close Circuit T.V., Combination Loader/Backhoe, Compactor with Blade, Concrete Finishing Machine, Gradall, Grader (Motor Grader), Elevator & Cage (Materials or Passenger), Excavator (and all attachments), Front End Loaders (1 1/2 yards and over), High Lift Lull and similar, Hoist (Single, Double, Triple Drum), Hoist Portable Mobile Unit, Hoist Engineer (Material), Jack and Bore Machine, Log Skidders, Mill Machines, Mucking Machines, Overhead Crane, Paver (concrete), Post Pounder (of any type), Push Cats, Road Reclaimer, Robot Hammer (Brokk or similar), Robotic Equipment (Scope of Engineer Schedule), Ross Carrier and similar, Scrapers (20 yard struck and over), Side Boom, Slip Form Machine, Spreader (Asphalt), Trenching Machines (Telephies-Vermeer Concrete Saw), Tractor Type Demolition Equipment, Vacuum Truck. Vibratory Roller(Riding) or Roller used in mainline paving operations.

GROUP I-B: Asphalt Mobile Conveyor/Transfer Machine, Road Paver (Asphalt).

GROUP II-A: Ballast Regulators, Compactor Self Propelled, Fusion Machine, Rail Anchor Machines, Roller (4 ton and over), Scrapers (20 yard struck and under).

GROUP II-B: Mechanic (Outside) All Types, Shop Mechanic.

GROUP III: Air Tractor Drill, Asphalt Plant, Batch Plant, Boiler (High Pressure), Concrete Breaker (Track or Rubber Tire), Concrete Pump, Concrete Spreader, Excavator Drill, Farm Tractor, Forklift (all types), Gas Tapping (Live), Hydroseeder, Loader (1 1/2 yards and under), Locomotive (all sizes), Machine Pulling Sheeps Foot Roller, Portable Asphalt Plant, Portable Batch Plant, Portable Crusher (Apprentice), Powerhouse Plant, Roller (under 4 ton), Sheer Excavator, Skid Steer/Bobcat, Stone Crusher, Sweeper (with seat), Well Drilling Machine.

GROUP IV: Service Person (Grease Truck), Deckhand.

GROUP IV-B: Conveyor Belt Machine (Truck Mounted), Heater (all types), Lighting Unit (Portable), Maintenance Engineer (For Crane Only), Mechanics Helper, Pump (Fireproofing), Pumps-Pump Station/Water/Sewer/Gypsum/Plaster, etc., Pump Truck (Sewer Jet or Similar), Welders Helper, Welding Machine (Steel Erection), Well Point System.

GROUP V: All Tower Cranes-All Climbing Cranes and all cranes of 100-ton capacity or greater (3900 Manitowac or similar) irrespective of manufacturer and regardless of how the same is rigged, Hoist Engineer (Steel), Engineer-Pile Driver, Jersey Spreader, Pavement Breaker/Post Hole Digger.

WAGES: Per hour:	07/01/2021	03/07/2022	03/06/2023
Group I	\$ 64.63	\$ 65.97	\$ 67.27
Group I-A	57.02	58.16	59.26
Group I-B	60.06	61.28	62.46
Group II-A	54.61	55.70	56.74
Group II-B	56.31	57.44	58.52
Group III	53.66	54.72	55.74
Group IV	48.80	49.74	50.63
Group IV-B	41.94	42.71	43.43
Group V			
Engineer All Tower, Climbing and			
Cranes of 100 Tons	73.18	74.73	76.24
Hoist Engineer(Steel)	66.29	67.67	69.01

Engineer(Pile Driver)	70.67	72.16	73.61
Jersey Spreader,Pavement Breaker (Air Ram)Post Hole Digger	55.87	56.99	58.06

SHIFT DIFFERENTIAL:

A 15% premium on all hours paid, including overtime hours for 2nd, 3rd shifts on all government mandated off-shift work

Engineers operating cranes with booms 100 feet but less than 149 feet in length will be paid an additional \$2.00 per hour over the rate listed in the Wage Schedule. Engineers operating cranes with booms 149 feet or over in length will be paid an additional \$3.00 per hour over the rate listed in the Wage Schedule. Loader and Excavator Operators: over 5 cubic yards capacity \$0.50 per hour over the rate listed in the Wage Schedule. Shovel Operators: over 4 cubic yards capacity \$1.00 per hour over the rate listed in the Wage Schedule.

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 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:

Journeyworker:	07/01/2021	03/07/2022	03/06/2023
	\$ 31.60 up to 40 Hours	\$ 32.60 up to 40 hours	\$ 33.75 up to 40 hours
	After 40 hours \$ 22.40* PLUS \$ 1.20 on all hours worked	After 40 hours \$ 23.40* PLUS \$ 1.20 on all hours worked	After 40 hours \$ 24.50* PLUS \$ 1.25 on all hours worked

*This amount is subject to premium

OVERTIME PAY

See (B, E, E2, P, *R, **U) on OVERTIME PAGE

HOLIDAY

Paid:..... See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE

Overtime..... See (5, 6, 8, 15, 25, 26) on OVERTIME PAGE

* For Holiday codes 8,15,25,26 code R applies

** For Holiday Codes 5 & 6 code U applies

Note: If employees are required to work on Easter Sunday they shall be paid at the rate of triple time.

REGISTERED APPRENTICES

(1)year terms at the following rate.

	07/01/2021	03/07/2022	03/06/2023
1st term	\$ 28.51	\$ 29.08	\$ 29.63
2nd term	34.21	34.90	35.56
3rd term	39.91	40.71	41.48
4th term	45.61	46.53	47.41
Supplemental Benefits per hour:			
	23.60	24.55	25.70

8-137HH

Operating Engineer - Heavy&Highway

10/01/2021

JOB DESCRIPTION Operating Engineer - Heavy&Highway

DISTRICT 9

ENTIRE COUNTIES

Putnam, Westchester

PARTIAL COUNTIES

Dutchess: South of the North city line of Poughkeepsie

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 Crew

Catogories cover GPS & Underground Surveying

Per Hour: 07/01/2021

Party Chief \$ 81.72

Instrument Man 61.43
Rodman 52.40

SUPPLEMENTAL BENEFITS

Per Hour: 07/01/2021

All Catogories
Straight Time: \$ 25.25* plus \$7.15

Premium:
Time & 1/2 \$ 37.88* plus \$7.15

Double Time \$ 50.50* plus \$7.15

Non-Worked Holiday Supplemental Benefits:
\$ 16.45

OVERTIME PAY

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

* Doubletime paid on all hours in excess of 8 hours on Saturday

HOLIDAY

Paid: See (5, 6, 7, 11, 12) on HOLIDAY PAGE
Overtime: See (5, 6, 7, 11, 12) on HOLIDAY PAGE

9-15Dh

Operating Engineer - Heavy&Highway - Tunnel

10/01/2021

JOB DESCRIPTION Operating Engineer - Heavy&Highway - Tunnel

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

PARTIAL COUNTIES

Dutchess: All the counties of Westchester and Putnam and the southern part of Dutchess County defined by the northern boundary line of the City of Poughkeepsie, then due east to Route 115, then north along Route 115 to Bedell Road, then east along Bedell Road to Van Wagner Road, then north along Van Wagner Road to Bower Road, then east along Bower Road to Route 44 and along Route 44 east to Route 343, then along Route 343 east to the northern boundary of Town of Dover Plains and east along the northern boundary of Town of Dover Plains to the border line of the State of Connecticut and bordered on the west by the middle of the Hudson River.

WAGES

GROUP I: Boom Truck, Cherry Picker, Clamshell, Crane(Crawler,Truck), Dragline, Drill Rig Casa Grande(Cat or Similar), Floating Crane(Crane on Barge-Under 100 Tons), Hoist Engineer(Concrete/Crane-Derrick-Mine Hoist), Knuckle Boom Crane, Rough Terrain Crane.

GROUP I-A: Auger(Truck or Truck Mounted), Boat Captain, Bull Dozer-all sizes, Central Mix Plant Operator, Chipper-all types, Close Circuit T.V., Combination Loader/Backhoe, Compactor with Blade, Concrete Finishing Machine, Gradall, Grader(Motor Grader), Elevator & Cage(Materials or Passengers), Excavator(and all attachments), Front End Loaders(1 1/2 yards and over), High Lift Lull, Hoist(Single, Double, Triple Drum), Hoist Portable Mobile Unit, Hoist Engineer(Material), Jack and Bore Machine, Log Skidder, Milling Machine, Moveable Concrete Barrier Transfer & Transport Vehicle, Mucking Machines. Overhead Crane, Paver(Concrete), Post Pounder of any type, Push Cats, Road Reclaimer, Robot Hammer(Brokk or similar), Robotic Equipment(Scope of Engineer Schedule), Ross Carrier and similar machines, Scrapers(20 yards struck and over), Side Boom, Slip Form Machine, Spreader(Asphalt), Trenching Machines, Telephies-Vermeer Concrete Saw, Tractor type demolition equipment, Vacuum Truck, Vibratory Roller (Riding) used in mainline paving operations.

GROUP I-B: Asphalt Mobile Conveyor/Transfer Machine, Road Paver(Asphalt).

GROUP II-A: Ballast Regulators, Compactor(Self-propelled), Fusion Machine, Rail Anchor Machines, Roller(4 ton and over), Scrapers(20 yard struck and under).

GROUP II-B: Mechanic(outside)all types, Shop Mechanic.

GROUP III: Air Tractor Drill, Asphalt Plant, Batch Plant, Boiler(High Pressure), Concrete Breaker(Track or Rubber Tire), Concrete Pump, Concrete Spreader, Excavator Drill, Farm Tractor, Forklift(all types of power), Gas Tapping(Live), Hydroseeder, Loader(1 1/2 yards and under), Locomotive(all sizes), Machine Pulling Sheeps Foot Roller, Portable Asphalt Plant, Portable Batch Plant, Portable Crusher(Apprentice), Powerhouse Plant, Roller(under 4 ton), Sheer Excavator, Skidsteer/Bobcat, Stone Crusher, Sweeper(with seat), Well Drilling Machine.

GROUP IV-A: Service Person(Grease Truck), Deckhand.

GROUP IV-B: Conveyor Belt Machine(Truck Mounted), Heater(all types), Lighting Unit(Portable), Maintenance Engineer(for Crane only), Mechanics Helper, Pump(Fireproofing), Pumps-Pump Station/Water/Sewer/Gypsum/Plaster, etc., Pump Truck(Sewer Jet or similar), Welding Machine(Steel Erection), Welders Helper.

GROUP V-A: Engineer(all Tower Cranes, all Climbing Cranes & all Cranes of 100 ton capacity or greater),Hoist Engineer(Steel-Sub Structure), Engineer-Pile Driver, Jersey-Spreader, Pavement breaker, Post Hole Digger

WAGES: (per hour)

	07/01/2021	03/07/2022	03/06/2023
GROUP I	\$ 64.63	\$ 65.97	\$ 67.27
GROUP I-A	57.02	58.16	59.21
GROUP I-B	60.06	61.28	62.46
GROUP II-A	54.61	55.70	56.74
GROUP II-B	56.31	57.44	58.52
GROUP III	53.66	54.72	55.74
GROUP IV-A	48.80	49.74	50.63
GROUP IV-B	41.94	42.71	43.43
GROUP V-A			
Engineer-Cranes	73.18	74.73	76.24
Engineer-Pile Driver	70.67	72.16	73.61
Hoist Engineer	66.29	67.67	69.01
Jersey Spreader/Post Hole Digger	55.87	56.99	58.06

SHIFT DIFFERENTIAL:

A 15% premium on all hours paid, including overtime hours for 2nd, 3rd shifts
on all government mandated off-shift work

An additional 20% to wage when required to wear protective equipment on hazardous/toxic waste projects. Operators required to use two buckets pouring concrete on other than road pavement shall receive \$0.50 per hour over scale. Engineers operating cranes with booms 100 feet but less than 149 feet in length will be paid an additional \$2.00 per hour. Engineers operating cranes with booms 149 feet or over in length will be paid an additional \$3.00 per hour. Operators of shovels with a capacity over (4) cubic yards shall be paid an additional \$1.00 per hour. Operators of loaders with a capacity over (5) cubic yards shall be paid an additional \$0.50 per hour.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker:

	07/01/2021	03/07/2022	03/06/2023
	\$ 23.60	\$ 24.55	\$ 25.70
	+ \$8.00	+ \$8.00	+ \$8.00
(Limited to first 40 hours)		(Limited to first 40 hours)	(Limited to first 40 hours)

OVERTIME PAY

See (D, O, *U, V) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE

Overtime: See (5, 6, 8, 15, 25, 26) on HOLIDAY PAGE

* Note: For Holiday codes 5 & 6, code U applies. For Holiday codes 8, 15, 25, 26, code R applies.

Note: If employees are required to work on Easter Sunday, they shall be paid at the rate of triple time.

REGISTERED APPRENTICES

(1)year terms at the following rates:

	07/01/2021	03/07/2022	03/06/2023
1st term	\$ 28.51	\$ 29.08	\$ 29.63
2nd term	34.21	34.90	35.56
3rd term	39.91	40.71	41.48
4th term	45.61	46.53	47.41

Supplemental Benefits per hour:

All terms	\$ 23.60	\$ 24.55	\$ 25.70
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Operating Engineer - Marine Dredging

10/01/2021

JOB DESCRIPTION Operating Engineer - Marine Dredging

DISTRICT 4

ENTIRE COUNTIES

Albany, Bronx, Cayuga, Clinton, Columbia, Dutchess, Essex, Franklin, Greene, Jefferson, Kings, Monroe, Nassau, New York, Orange, 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 all equipment and operators are only for marine dredging work in navigable waters found in the counties listed above.

Per Hour:	07/01/2021	10/01/2021
CLASS A1 Deck Captain, Leverman Mechanical Dredge Operator Licensed Tug Operator 1000HP or more.	\$ 41.42	\$ 41.42
CLASS A2 Crane Operator (360 swing)	36.91	36.91
CLASS B Dozer, Front Loader Operator on Land	To conform to Operating Engineer Prevailing Wage in locality where work is being performed including benefits.	
CLASS B1 Derrick Operator (180 swing) Spider/Spill Barge Operator Operator II, Fill Placer, Engineer, Chief Mate, Electrician, Chief Welder, Maintenance Engineer Licensed Boat, Crew Boat Operator	35.82	35.82
CLASS B2 Certified Welder	33.72	33.72
CLASS C1 Drag Barge Operator, Steward, Mate, Assistant Fill Placer	32.80	32.80
CLASS C2 Boat Operator	30.89	31.74
CLASS D Shoreman, Deckhand, Oiler, Rodman, Scowman, Cook, Messman, Porter/Janitor	25.66	26.37

SUPPLEMENTAL BENEFITS

Per Hour:

THE FOLLOWING SUPPLEMENTAL BENEFITS APPLY TO ALL CATEGORIES

All Classes A & B	07/01/2021 \$11.98 plus 8% of straight time wage, Overtime hours add \$ 0.63	10/01/2021 \$11.98 plus 8% of straight time wage, Overtime hours add \$ 0.63
All Class C	\$11.68 plus 8% of straight time wage, Overtime hours add \$ 0.48	11.68 plus 8% of straight time wage, Overtime hours add \$ 0.48
All Class D	\$11.38 plus 8%	11.38 plus 8%

of straight time
wage, Overtime hours
add \$ 0.33

of straight time
wage, Overtime hours
add \$ 0.33

OVERTIME PAY

See (B2, 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

10/01/2021

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 Dutchess 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: 07/01/2021
Survey Classifications

Party Chief \$ 45.83
Instrument Man 38.17
Rodman 33.34

SUPPLEMENTAL BENEFITS

Per Hour:

All Crew Members: \$ 20.60

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

Painter

10/01/2021

JOB DESCRIPTION Painter

DISTRICT 8

ENTIRE COUNTIES

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

WAGES

Per hour: 07/01/2021

Brush \$ 50.30*

Abatement/Removal of lead based
or lead containing paint on
materials to be repainted. 50.30*

Spray & Scaffold \$ 53.30*
Fire Escape 53.30*
Decorator 53.30*
Paperhanger/Wall Coverer 52.93*

*Subtract \$ 0.10 to calculate premium rate.

SUPPLEMENTAL BENEFITS

Per hour: 07/01/2021

Paperhanger \$ 31.83
All others 29.81
Premium 33.40**

**Applies only to "All others" category, not paperhanger journeyworker.

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:	07/01/2021
Appr 1st term...	\$ 19.56*
Appr 2nd term...	25.12*
Appr 3rd term...	30.42*
Appr 4th term...	40.65*

*Subtract \$ 0.10 to calculate premium rate.

Supplemental benefits:

Per Hour:	07/01/2021
Appr 1st term...	\$ 14.72
Appr 2nd term...	18.23
Appr 3rd term...	21.06
Appr 4th term...	26.67

8-NYDC9-B/S

Painter

10/01/2021

JOB DESCRIPTION Painter

DISTRICT 8

ENTIRE COUNTIES

Putnam, Suffolk, Westchester

PARTIAL COUNTIES

Nassau: All of Nassau except the areas described below: Atlantic Beach, Ceadershurst, 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:	07/01/2021
Drywall Taper	\$ 50.30*

*Subtract \$ 0.10 to calculate premium rate.

SUPPLEMENTAL BENEFITS

Per hour:	07/01/2021
Journeyman	\$ 29.81

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:	07/01/2021
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1500 hour terms at the following wage rate:

1st term	\$ 19.56*
2nd term	25.12*
3rd term	30.42*
4th term	40.65*

*Subtract \$ 0.10 to calculate premium rate.

Supplemental Benefits - Per hour:

One year term (1500 hours) at the following dollar amount.

1st year	\$ 14.72
2nd year	18.23
3rd year	21.06
4th year	26.67

8-NYDCT9-DWT

Painter - Bridge & Structural Steel

10/01/2021

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:

STEEL:

Bridge Painting:	07/01/2021	10/01/2021
	\$ 51.50	\$ 53.00
	+ 8.63*	+ 9.63*

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.

SHIFT WORK:

When directly specified in public agency or authority contract documents for an employer to work a second shift and works the second shift with employees other than from the first shift, all employees who work the second shift will be paid 10% of the base wage shift differential in lieu of overtime for the first eight (8) hours worked after which the employees shall be paid at time and one half of the regular wage rate. When a single irregular work shift is mandated in the job specifications or by the contracting agency, wages shall be paid at time and one half for single shifts between the hours of 3pm-11pm or 11pm-7am.

SUPPLEMENTAL BENEFITS

Per Hour:

Journeyworker:	07/01/2021	10/01/2021
	\$ 10.90	\$ 10.90
	+ 30.00*	+ 30.60*

* 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 (B, F, R) on OVERTIME PAGE

HOLIDAY

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

REGISTERED APPRENTICES

Wage - Per hour:

Apprentices: (1) year terms	07/01/2021	10/01/2021
1st year	\$ 20.60	\$ 21.20
	+ 3.45*	+ 3.86*
2nd year	\$ 30.90	\$ 31.80
	+ 5.18*	+ 5.78*

3rd year	\$ 41.20 + 6.90*	\$ 42.40 + 7.70*
Supplemental Benefits - Per hour:		
1st year	\$.25 + 12.00*	\$.25 + 12.24*
2nd year	\$ 10.90 + 18.00*	\$ 10.90 + 18.36*
3rd year	\$ 10.20 + 24.00*	\$ 10.90 + 24.48*

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

8-DC-9/806/155-BrSS

Painter - Line Striping	10/01/2021
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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):	07/01/2021	07/01/2022
Striping-Machine Operator*	\$ 30.32	\$ 31.53
Linerman Thermoplastic	36.93	38.34

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:	07/01/2021	07/01/2022
Journeyworker:		
Striping Machine Operator:	\$ 10.03	\$ 10.03
Linerman Thermoplastic:	10.03	10.03

OVERTIME PAY

See (B, B2, E2, F, S) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 20) on HOLIDAY PAGE
Overtime: See (5, 20) on HOLIDAY PAGE

REGISTERED APPRENTICES

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

	07/01/2021	12/31/2021	07/01/2022
1st Term*:	\$ 15.00	\$ 15.00	\$ 15.00
1st Term**:	14.00	15.00	15.00
1st Term***:	12.50	13.20	13.20
2nd Term:	18.19	18.19	18.92
3rd Term:	24.26	24.26	25.22

*Bronx, Kings, New York, Queens, Richmond, and Suffolk counties

**Nassau and Westchester counties

***All other counties

Supplemental Benefits per hour:

1st term:	\$ 9.16	\$ 9.16	\$ 9.16
2nd Term:	9.16	9.16	10.03
3rd Term:	9.16	9.16	10.03

8-1456-LS

Painter - Metal Polisher

10/01/2021

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

	07/01/2021
Metal Polisher	\$ 37.13
Metal Polisher*	38.23
Metal Polisher**	41.13

*Note: Applies on New Construction & complete renovation

** Note: Applies when working on scaffolds over 34 feet.

SUPPLEMENTAL BENEFITS

Per Hour: 07/01/2021

Journeyworker:

All classification \$ 10.64

OVERTIME PAY

See (B, E, 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:

	07/01/2021
1st year	\$ 16.00
2nd year	17.00
3rd year	18.00
1st year*	\$ 16.39
2nd year*	17.44
3rd year*	18.54
1st year**	\$ 18.50
2nd year**	19.50
3rd year**	20.50

*Note: Applies on New Construction & complete renovation

** Note: Applies when working on scaffolds over 34 feet.

Supplemental benefits:

Per hour:

1st year	\$ 7.39
2nd year	7.39
3rd year	7.39

8-8A/28A-MP

Plumber

10/01/2021

JOB DESCRIPTION Plumber

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

WAGES

Per hour:

07/01/2021

Plumber and
Steamfitter

\$ 59.01

SHIFT WORK:

When directly specified in public agency or authority contract documents, shift work outside the regular hours of work shall be comprised of eight (8) hours per shift not including Saturday, Sundays and holidays. One half (1/2) hour shall be allowed for lunch after the first four (4) hours of each shift. Wage and Fringes for shift work shall be straight time plus a shift premium of twenty-five (25%) percent. A minimum of five days Monday through Friday must be worked to establish shift work.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker

\$ 39.26

OVERTIME PAY

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

OVERTIME:.... See on OVERTIME PAGE.

HOLIDAY

Paid:

See (1) on HOLIDAY PAGE

Overtime:

See (5, 6, 8, 16, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

(1)year terms at the following wages:

1st Term

\$ 21.89

2nd Term

25.13

3rd Term

29.01

4th Term

41.43

5th Term

44.45

Supplemental Benefits per hour:

1st term

\$ 16.25

2nd term

18.13

3rd term

21.57

4th term

28.41

5th term

30.11

8-21.1-ST

Plumber - HVAC / Service

10/01/2021

JOB DESCRIPTION Plumber - HVAC / Service

DISTRICT 8

ENTIRE COUNTIES

Dutchess, Putnam, Westchester

PARTIAL COUNTIES

Delaware: Only the townships of Middletown and Roxbury

Ulster: Entire County(including Wallkill and Shawangunk Prisons) except for remainder of Town of Shawangunk and Towns of Plattekill, Marlboro, and Wawarsing.

WAGES

Per hour:

07/01/2021

HVAC Service

\$ 40.68

+ \$ 4.32*

*Note: This portion of wage is not subject to overtime premium.

SUPPLEMENTAL BENEFITS

Per hour:

07/01/2021

Journeyworker HVAC Service

\$ 26.54

OVERTIME PAY

See (B, F, R) on OVERTIME PAGE

HOLIDAY

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

REGISTERED APPRENTICES

HVAC SERVICE

(1) year terms at the following wages:

1st yr.	2nd yr.	3rd yr.	4th yr.	5th yr.
\$ 18.50	\$ 21.88	\$ 27.31	\$ 33.56	\$ 36.36
+\$2.37*	+\$2.67*	+\$3.22*	+\$3.84*	+\$4.07*

*Note: This portion of wage is not subject to overtime premium.

Supplemental Benefits per hour:

Apprentices 07/01/2021

1st term	\$ 19.66
2nd term	20.86
3rd term	22.21
4th term	24.02
5th term	25.33

8-21.1&2-SF/Re/AC

Plumber - Jobbing & Alterations

10/01/2021

JOB DESCRIPTION Plumber - Jobbing & Alterations

DISTRICT 8

ENTIRE COUNTIES

Dutchess, Putnam, Westchester

PARTIAL COUNTIES

Ulster: Entire county (including Wallkill and Shawangunk Prisons in Town of Shawangunk) EXCEPT for remainder of Town of Shawangunk, and Towns of Plattekill, Marlboro, and Wawarsing.

WAGES

Per hour: 07/01/2021
Journeyworker: \$ 45.83

Repairs, replacements and alteration work is any repair or replacement of a present plumbing system that does not change existing roughing or water supply lines.

SHIFT WORK:

When directly specified in public agency or authority contract documents, shift work outside the regular hours of work shall be comprised of eight (8) hours per shift not including Saturday, Sundays and holidays. One half (1/2) hour shall be allowed for lunch after the first four (4) hours of each shift. Wage and Fringes for shift work shall be straight time plus a shift premium of twenty-five (25%) percent. A minimum of five days Monday through Friday must be worked to establish shift work.

SUPPLEMENTAL BENEFITS

Per hour:
Journeyworker

\$ 32.96

OVERTIME PAY

See (B, *E, E2, Q, V) on OVERTIME PAGE

*When used as a make-up day, hours after 8 on Saturday shall be paid at time and one half.

HOLIDAY

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

REGISTERED APPRENTICES

(1) year terms at the following wages:

1st year	\$ 19.88
2nd year	22.06
3rd year	23.90
4th year	33.57
5th year	35.46

Supplemental Benefits per hour:

1st year	\$ 10.74
2nd year	12.65
3rd year	16.58
4th year	22.39
5th year	24.32

8-21.3-J&A

Roofer

10/01/2021

JOB DESCRIPTION Roofer

DISTRICT 9

ENTIRE COUNTIES

Bronx, Dutchess, Kings, New York, Orange, Putnam, Queens, Richmond, Rockland, Sullivan, Ulster, Westchester

WAGES

Per Hour: 07/01/2021

Roofer/Waterproofer \$ 45.25
+ \$7.00*

* This portion is not subjected to overtime premiums.

Note: Abatement/Removal of Asbestos containing roofs and roofing material is classified as Roofer.

SUPPLEMENTAL BENEFITS

Per Hour: \$ 28.62

OVERTIME PAY

See (B, H) on OVERTIME PAGE

Note: An observed holiday that falls on a Sunday will be observed the following Monday.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES

(1) year term

1st	2nd	3rd	4th
\$ 15.84	\$ 22.63	\$ 27.15	\$ 33.94
	+ 3.50*	+ 4.20*	+ 5.26*

Supplements:

1st	2nd	3rd	4th
\$ 3.72	\$ 14.47	\$ 17.30	\$ 21.55

9-8R

Sheetmetal Worker

10/01/2021

JOB DESCRIPTION Sheetmetal Worker

DISTRICT 8

ENTIRE COUNTIES

Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, Westchester

WAGES

07/01/2021
SheetMetal Worker \$ 44.15
+ 3.37*

*This portion is not subject to overtime premiums.

SHIFT WORK

For all NYS D.O.T. and other Governmental mandated off-shift work:

10% increase for additional shifts for a minimum of five (5) days

SUPPLEMENTAL BENEFITS

Journeyworker \$ 44.20

OVERTIME PAY

OVERTIME: See (B, E, Q,) on OVERTIME PAGE.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6, 8, 15, 16, 23) on HOLIDAY PAGE

REGISTERED APPRENTICES

1st	2nd	3rd	4th	5th	6th	7th	8th
\$ 16.36	\$ 18.41	\$ 20.46	\$ 22.51	\$ 24.54	\$ 26.60	\$ 29.12	\$ 31.65
+ 1.35*	+ 1.52*	+ 1.69*	+ 1.85*	+ 2.02*	+ 2.19*	+ 2.36*	+ 2.53*

*This portion is not subject to overtime premiums.

Supplemental Benefits per hour:

Apprentices

1st term	\$ 18.96
2nd term	21.34
3rd term	23.71
4th term	26.11
5th term	28.46
6th term	30.82
7th term	32.72
8th term	34.64

8-38

Sheetmetal Worker

10/01/2021

JOB DESCRIPTION Sheetmetal Worker

DISTRICT 4

ENTIRE COUNTIES

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

WAGES

Per Hour:	07/01/2021	8/01/2021
Sign Erector	\$ 52.29	\$ 53.97

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

SUPPLEMENTAL BENEFITS

Per Hour:	07/01/2021	8/01/2021
Sign Erector	\$ 51.26	\$ 53.15

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:

07/01/2021

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$ 14.34	\$ 16.26	\$ 18.17	\$ 20.10	\$ 28.02	\$ 30.47	\$ 33.72	\$ 36.27	\$ 38.77	\$ 41.29

8/01/2021

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$ TBD	\$ TBD	\$ TBD	\$ TBD	\$ TBD	\$ TBD	\$ TBD	\$ TBD	\$ TBD	\$ TBD

4-137-SE

Sprinkler Fitter

10/01/2021

JOB DESCRIPTION Sprinkler Fitter

DISTRICT 1

ENTIRE COUNTIES

Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, Westchester

WAGES

Per hour 07/01/2021

Sprinkler \$ 47.19
Fitter

SUPPLEMENTAL BENEFITS

Per hour

Journey person \$ 28.09

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

Note: When a holiday falls on Sunday, the following Monday shall be considered a holiday and all work performed on either day shall be at the double time rate. When a holiday falls on Saturday, the preceding Friday shall be considered a holiday and all work performed on either day shall be at the double time rate.

REGISTERED APPRENTICES

Wages per hour

One Half Year terms at the following wage.

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$ 22.67	\$ 25.19	\$ 27.46	\$ 29.98	\$ 32.50	\$ 35.02	\$ 37.54	\$ 40.05	\$ 42.57	\$ 45.09

Supplemental Benefits per hour

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$ 8.27	\$ 8.27	\$ 19.22	\$ 19.22	\$ 19.47	\$ 19.47	\$ 19.47	\$ 19.47	\$ 19.47	\$ 19.47
									1-669.2

Teamster - Building / Heavy&Highway

10/01/2021

JOB DESCRIPTION Teamster - Building / Heavy&Highway

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

WAGES

GROUP A: Straight Trucks (6-wheeler and 10-wheeler), A-frame, Winch, Dynamite Seeding, Mulching, Agitator, Water, Attenuator, Light Towers, Cement (all types), Suburban, Station Wagons, Cars, Pick Ups, any vehicle carrying materials of any kind.

GROUP AA: Tack Coat

GROUP B: Tractor & Trailers (all types).

GROUP BB: Tri-Axle, 14 Wheeler

GROUP C: Low Boy (carrying equipment).

GROUP D: Fuel Trucks, Tire Trucks.

GROUP E: Off-road Equipment (over 40 tons): Athey Wagons, Belly Dumps, Articulated Dumps, Trailer Wagons.

GROUP F: Off-road Equipment (over 40 tons) Euclid, DJB.

GROUP G: Off-road Equipment (under 40 tons) Athey Wagons, Belly Articulated Dumps, Trailer Wagons.

GROUP H: Off-road Equipment (under 40 tons), Euclid.

GROUP HH: Off-road Equipment (under 40 tons) D.J.B.

GROUP I: Off-road Equipment (under 40 tons) Darts.

GROUP II: Off-road Equipment (under 40 tons) RXS.

WAGES:(per hour)

07/01/2021

GROUP A	\$ 42.47*
GROUP AA	45.27*
GROUP B	43.09*
GROUP BB	42.59*
GROUP C	45.22*
GROUP D	42.92*
GROUP E	43.47*
GROUP F	44.47*
GROUP G	43.22*
GROUP H	43.84*
GROUP HH	44.22*
GROUP I	43.97*

GROUP II 44.34*

* To calculate premium wage, subtract \$.20 from the hourly wage.

Note: Fuel truck operators on construction sites addit. \$5.00 per day.
For work on hazardous/toxic waste site addit. 20% of hourly rate.

Shift Differential: NYS DOT or other Governmental Agency contracts shall receive a shift differential of Fifteen(15%)percent above the wage rate

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:
Journeyworker

First 40 hours	\$ 33.64
41st-45th hours	15.18
Over 45 hours	0.26

OVERTIME PAY

See (B, E, P, R) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6, 8, 9, 15, 25) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 9, 15, 25) on HOLIDAY PAGE

8-456

Welder

10/01/2021

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 07/01/2021

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

- (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
- (U) Four times the hourly rate for Holidays
- (V) Including benefits at SAME PREMIUM as shown for overtime
- (W) Time and one half for benefits on all overtime hours.
- (X) Benefits payable on Paid Holiday at straight time. If worked, additional benefit amount will be required for worked hours. (Refer to other codes listed.)

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
- (28) Easter Sunday

(29) Juneteenth



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

☐ 10 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



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.

The agency issuing the determination and providing the information, is denoted under the heading 'Fiscal Officer'. DOL = New York State Department of Labor; NYC = New York City Comptroller's Office; AG = New York State Attorney General's Office; DA = County District Attorney's Office.

Debarment Database: To search for contractors, sub-contractors and/or their successors debarred from bidding or being awarded any public work contract or subcontract under NYS Labor Law Articles 8 and 9, or under NYS Workers' Compensation Law Section 141-b, access the database at this link: <https://applications.labor.ny.gov/EDList/searchPage.do>

For inquiries where WCB is listed as the "Agency", please call 1-866-546-9322

NYSDOL Bureau of Public Work Debarment List 10/15/2021

Article 8

AGENCY	Fiscal Officer	FEIN	EMPLOYER NAME	EMPLOYER DBA NAME	ADDRESS	DEBARMENT START DATE	DEBARMENT END DATE
DOL	NYC	*****9839	A.J.S. PROJECT MANAGEMENT, INC.		149 FIFTH AVENUE NEW YORK NY 10010	12/29/2016	12/29/2021
DOL	DOL	*****4018	ADIRONDACK BUILDING RESTORATION INC.		4156 WILSON ROAD EAST TABERG NY 13471	03/26/2019	03/26/2024
DOL	AG	*****1812	ADVANCED BUILDERS & LAND DEVELOPMENT, INC.		400 OSER AVE #2300HAUPPAUGE NY 11788	09/11/2019	09/11/2024
DOL	DOL	*****1687	ADVANCED SAFETY SPRINKLER INC		261 MILL ROAD P.O BOX 296EAST AURORA NY 14052	05/29/2019	05/29/2024
DOL	NYC	*****6775	ADVENTURE MASONRY CORP.		1535 RICHMOND AVENUE STATEN ISLAND NY 10314	12/13/2017	12/13/2022
DOL	NYC		AGOSTINHO TOME		405 BARRETTO ST BRONX NY 10474	05/31/2018	05/31/2023
DOL	NYC		AMJAD NAZIR		2366 61ST ST BROOKLYN NY 11204	12/15/2016	12/15/2021
DOL	NYC		AMJED PARVEZ		401 HANOVER AVENUE STATEN ISLAND NY 10304	01/11/2021	01/11/2026
DOL	DOL		ANGELO F COKER		2610 SOUTH SALINA STREET SUITE 14SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL		ANGELO F COKER		2610 SOUTH SALINA STREET SUITE 14SYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	DOL		ANITA SALERNO		158 SOLAR ST SYRACUSE NY 13204	01/07/2019	01/07/2024
DOL	NYC		ANTHONY J SCLAFANI		149 FIFTH AVE NEW YORK NY 10010	12/29/2016	12/29/2021
DOL	DOL		ANTHONY PERGOLA		3 WEST MAIN ST/SUITE 208 ELMSFORD NY 10323	01/23/2017	01/23/2022
DOL	DOL		ANTONIO ESTIVEZ		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL		ARNOLD A. PAOLINI		1250 BROADWAY ST BUFFALO NY 14212	02/03/2020	02/03/2025
DOL	NYC		ARSHAD MEHMOOD		168-42 88TH AVENUE JAMAICA NY 11432	11/20/2019	11/20/2024
DOL	DOL		ARVINDER ATWAL		65 KENNETH PLACE NEW HYDE PARK NY 11040	07/19/2017	07/19/2022
DOL	NYC	*****6683	ATLAS RESTORATION CORP.		35-12 19TH AVENUE ASTORIA NY 11105	08/02/2017	08/02/2022
DOL	NYC	*****5532	ATWAL MECHANICALS, INC		65 KENNETH PLACE NEW HYDE PARK NY 11040	07/19/2017	07/19/2022
DOL	NYC	*****2591	AVI 212 INC.		260 CROSEY AVENUE APT 11GBROOKLYN NY 11214	10/30/2018	10/30/2023
DOL	NYC		AZIDABEGUM		524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025
DOL	NYC		BALWINDER SINGH		421 HUDSON ST SUITE C5NEW YORK NY 10014	02/20/2019	02/20/2024
DOL	NYC	*****8416	BEAM CONSTRUCTION, INC.		50 MAIN ST WHITE PLAINS NY 10606	01/04/2019	01/04/2024
DOL	NYC	*****2113	BHW CONTRACTING, INC.		401 HANOVER AVENUE STATEN ISLAND NY 10304	01/11/2021	01/11/2026
DOL	DOL		BIAGIO CANTISANI			06/12/2018	06/12/2023
DOL	DOL	*****4512	BOB BRUNO EXCAVATING, INC		5 MORNINGSIDE DR AUBURN NY 13021	05/28/2019	05/28/2024
DOL	DOL		BOGDAN MARKOVSKI		370 W. PLEASANTVIEW AVE SUITE 2.329HACKENSACK NJ 07601	02/11/2019	02/11/2024
DOL	DOL		BRADLEY J SCHUKA		4 BROTHERS ROAD WAPPINGERS FALLS NY 12590	10/20/2020	10/20/2025
DOL	DOL		BRUCE P. NASH JR.		5841 BUTTERNUT ROAD EAST SYRACUSE NY 13057	09/12/2018	09/12/2023
DOL	DOL	*****0225	C&D LAFACE CONSTRUCTION, INC.		8531 OSWEGO RD BALDWINVILLE NY 13027	02/03/2020	01/09/2023
DOL	DOL	*****8809	C.B.E. CONTRACTING CORPORATION		310 MCGUINNESS BLVD GREENPOINT NY 11222	03/07/2017	03/07/2022
DOL	DOL	*****9383	C.C. PAVING AND EXCAVATING, INC.		2610 SOUTH SALINA ST SUITE 12SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL	*****9383	C.C. PAVING AND EXCAVATING, INC.		2610 SOUTH SALINA ST SUITE 12SYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	DOL	*****5161	CALADRI DEVELOPMENT CORP.		1223 PARK ST. PEEKSKILL NY 10566	05/17/2021	05/17/2026
DOL	DOL	*****3391	CALI ENTERPRISES, INC.		1223 PARK STREET PEEKSKILL NY 10566	05/17/2021	05/17/2026

NYSDOL Bureau of Public Work Debarment List 10/15/2021

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DOL	NYC		CALVIN WALTERS		465 EAST THIRD ST MT. VERNON NY 10550	09/09/2019	09/09/2024
DOL	DOL		CANTISANI & ASSOCIATES LTD		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL		CANTISANI HOLDING LLC			06/12/2018	06/12/2023
DOL	DOL		CARMEN RACHETTA		8531 OSWEGO RD BALDWINVILLE NY 13027	02/03/2020	02/03/2025
DOL	DOL		CARMENA RACHETTA		8531 OSWEGO ROAD BALDWINVILLE NY 13027	02/03/2020	01/09/2023
DOL	DOL	*****3812	CARMODY "2" INC			06/12/2018	06/12/2023
DOL	DOL	*****1143	CARMODY BUILDING CORP	CARMODY CONTRACTIN G AND CARMODY CONTRACTIN G CORP.	442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL		CARMODY CONCRETE CORPORATION			06/12/2018	06/12/2023
DOL	DOL		CARMODY ENTERPRISES, LTD.		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL		CARMODY INC		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL	*****3812	CARMODY INDUSTRIES INC			06/12/2018	06/12/2023
DOL	DOL		CARMODY MAINTENANCE CORPORATION		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL		CARMODY MASONRY CORP		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL	*****8809	CBE CONTRACTING CORP		142 EAST MARKET STREET LONG BEACH NY 11561	03/07/2017	03/07/2022
DOL	AG		CESAR J. AGUDELO		81-06 34TH AVENUE APT. 6EJACKSON HEIGHTS NY 11372	02/07/2018	02/07/2023
DOL	DOL	*****0026	CHANTICLEER CONSTRUCTION LLC		4 BROTHERS ROAD WAPPINGERS FALLS NY 12590	10/20/2020	10/20/2025
DOL	DOL		CHRISTOPHER GRECO		26 NORTH MYRTLE AVENUE SPRING VALLEY NY 10956	02/18/2021	02/18/2026
DOL	DOL		CHRISTOPHER J MAINI		19 CAITLIN AVE JAMESTOWN NY 14701	09/17/2018	09/17/2023
DOL	DOL		CHRISTOPHER PAPASTEFANO A/K/A CHRIS PAPASTEFANO		1445 COMMERCE AVE BRONX NY 10461	05/30/2019	05/30/2024
DOL	DOL	*****1927	CONSTRUCTION PARTS WAREHOUSE, INC.	CPW	5841 BUTTERNUT ROAD EAST SYRACUSE NY 13057	09/12/2018	09/12/2023
DOL	DOL	*****3228	CROSS-COUNTY LANDSCAPING AND TREE SERVICE, INC.	ROCKLAND TREE SERVICE	26 NORTH MYRTLE AVENUE SPRING VALLEY NY 10956	02/18/2021	02/18/2026
DOL	DOL	*****2524	CSI ELECTRICAL & MECHANICAL INC		42-32 235TH ST DOUGLSTON NY 11363	01/14/2019	01/14/2024
DOL	NYC		DALJIT KAUR BOPARAI		185-06 56TH AVE FRESH MEADOW NY 11365	10/17/2017	10/17/2022
DOL	DOL		DANICA IVANOSKI		61 WILLETT ST. PASSAIC NJ 07503	10/26/2016	10/26/2021
DOL	DOL		DARIAN L COKER		2610 SOUTH SALINA ST SUITE 2CSYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL		DARIAN L COKER		2610 SOUTH SALINA ST SUITE 2CSYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	NYC		DAVID WEINER		14 NEW DROP LANE 2ND FLOORSTATEN ISLAND NY 10306	11/14/2019	11/14/2024
DOL	DOL		DEBBIE STURDEVANT		29 MAPLEWOOD DRIVE BINGHAMTON NY 13901	02/21/2017	02/21/2022
DOL	AG		DEBRA MARTINEZ		31 BAY ST BROOKLYN NY 11231	03/28/2018	03/28/2023
DOL	DOL		DELPHI PAINTING & DECORATING CO INC		1445 COMMERCE AVE BRONX NY 10461	05/30/2019	05/30/2024
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	NYC		DIMITRIOS TSOUMAS		35-12 19TH AVENUE ASTORIA NY 11105	08/02/2017	08/02/2022
DOL	DOL		DOMENICO LAFACE		8531 OSWEGO RD BALDWINVILLE NY 13027	02/03/2020	01/09/2023

NYSDOL Bureau of Public Work Debarment List 10/15/2021

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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	NYC		DUARTE LOPES		66-05 WOODHAVEN BLVD. STE 2REGO PARK NY 11374	04/20/2017	04/20/2022
DOL	DOL	*****5175	EAGLE MECHANICAL AND GENERAL CONSTRUCTION LLC		11371 RIDGE RD WOLCOTT NY 14590	02/03/2020	02/03/2025
DOL	DOL		EAST COAST PAVING		2238 BAKER RD GILLET PA 16923	03/12/2018	03/12/2023
DOL	NYC	*****4269	EAST PORT EXCAVATION & UTILITIES		601 PORTION RD RONKONKOMA NY 11779	11/18/2016	11/18/2021
DOL	DOL	*****0780	EMES HEATING & PLUMBING CONTR		5 EMES LANE MONSEY NY 10952	01/20/2002	01/20/3002
DOL	NYC	*****5917	EPOCH ELECTRICAL, INC		97-18 50TH AVE CORONA NY 11368	04/19/2018	04/19/2024
DOL	DOL		FAIGY LOWINGER		11 MOUNTAIN RD 28 VAN BUREN DRMONROE NY 10950	03/20/2019	03/20/2024
DOL	DOL		FRANK BENEDETTO		19 CATLIN AVE JAMESTOWN NY 14701	09/17/2018	09/17/2023
DOL	DOL	*****4722	FRANK BENEDETTO AND CHRISTOPHER J MAINI	B & M CONCRETE	19 CAITLIN AVE JAMESTOWN NY 14701	09/17/2018	09/17/2023
DOL	NYC		FRANK MAINI		1766 FRONT ST YORKTOWN HEIGHTS NY 10598	01/17/2018	01/17/2023
DOL	NYC	*****6616	G & G MECHANICAL ENTERPRISES, LLC.		1936 HEMPSTEAD TURNPIKE EAST MEDOW NY 11554	11/29/2019	11/29/2024
DOL	DOL		GABRIEL FRASSETTI			04/10/2019	04/10/2024
DOL	DOL		GEOFF CORLETT		415 FLAGGER AVE #302STUART FL 34994	10/31/2018	10/31/2023
DOL	DA		GEORGE LUCEY		150 KINGS STREET BROOKLYN NY 11231	01/19/1998	01/19/2998
DOL	DOL		GIGI SCHNECKENBURGER		261 MILL RD EAST AURORA NY 14052	05/29/2019	05/29/2024
DOL	DOL		GIOVANNI LAFACE		8531 OSWEGO RD BALDWINVILLE NY 13027	02/03/2020	01/09/2023
DOL	NYC	*****3164	GLOBE GATES INC	GLOBAL OVERHEAD DOORS	405 BARRETTO ST BRONX NY 10474	05/31/2018	05/31/2023
DOL	NYC		GREAT ESTATE CONSTRUCTION, INC.		327 STAGG ST BROOKLYN NY 11206	10/10/2017	10/10/2022
DOL	DOL		GREGORY S. OLSON		P.O BOX 100 200 LATTA BROOK PARKHORSEHEADS NY 14845	03/08/2018	03/08/2023
DOL	DOL		HANS RATH		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
DOL	NYC	*****3228	HEIGHTS ELEVATOR CORP.		1766 FRONT ST YORKTOWN HEIGHTS NY 10598	01/17/2018	01/17/2023
DOL	DOL	*****5131	INTEGRITY MASONRY, INC.	M&R CONCRETE	722 8TH AVE WATERVLIET NY 12189	06/05/2018	06/05/2023
DOL	DOL		IRENE KASELIS		32 PENNINGTON AVE WALDWICK NJ 07463	05/30/2019	05/30/2024
DOL	DOL	*****9211	J. WASE CONSTRUCTION CORP.		8545 RT 9W ATHENS NY 12015	03/09/2021	03/09/2026
DOL	DOL		J.A. HIRES CADWALLADER		P.O BOX 100 200 LATTA BROOK PARKHORSEHEADS NY 14845	03/08/2018	03/08/2023
DOL	DOL		JAMES C. DELGIACCO		722 8TH AVE WATERVLIET NY 12189	06/05/2018	06/05/2023
DOL	DOL		JAMES J. BAKER		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL		JAMES LIACONE		9365 WASHINGTON ST LOCKPORT IL 60441	07/23/2018	07/23/2023
DOL	DOL		JAMES RACHEL		9365 WASHINGTON ST LOCKPORT IL 60441	07/23/2018	07/23/2023
DOL	DOL	*****7993	JBS DIRT, INC.		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL	*****5368	JCH MASONRY & LANDSCAPING INC.		35 CLINTON AVE OSSINING NY 10562	09/12/2018	09/12/2023
DOL	NYC		JENNIFER GUERRERO		1936 HEMPSTEAD TURNPIKE EAST MEADOW NY 11554	11/29/2019	11/29/2024

NYSDOL Bureau of Public Work Debarment List 10/15/2021

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DOL	DOL		JIM PLAUGHER		17613 SANTE FE LINE ROAD WAYNEFIELD OH 45896	07/16/2021	07/16/2026
DOL	AG		JOHN ANTHONY MASSINO		36-49 204TH STREET BAYSIDE NY 11372	02/07/2018	02/07/2023
DOL	DOL		JOHN F. CADWALLADER		200 LATTI BROOK PARK HORSEHEADS NY 14845	03/08/2018	03/08/2023
DOL	DOL	*****4612	JOHN F. CADWALLADER, INC.	THE GLASS COMPANY	P.O BOX 100 200 LATTI BROOK PARKHORSEHEADS NY 14845	03/08/2018	03/08/2023
DOL	DOL		JOHN GOCEK		14B COMMERCIAL AVE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	DOL		JOHN LUCIANO			05/14/2018	05/14/2023
DOL	DOL		JOHN WASE		8545 RT 9W ATHENS NY 12015	03/09/2021	03/09/2026
DOL	AG	*****0600	JOHNCO CONTRACTING, INC.		36-49 204TH STREET BAYSIDE NY 11372	02/07/2018	02/07/2023
DOL	DOL		JON E DEYOUNG		261 MILL RD P.O BOX 296EAST AURORA NY 14052	05/29/2019	05/29/2024
DOL	DOL		JORGE RAMOS		8970 MIKE GARCIA DR MANASSAS VA 20109	07/16/2021	07/16/2026
DOL	DOL		JORI PEDERSEN		415 FLAGER AVE #302STUART FL 34994	10/31/2018	10/31/2023
DOL	DOL		JOSE CHUCHUCA		35 CLINTON AVE OSSINING NY 10562	09/12/2018	09/12/2023
DOL	NYC		JOSEPH FOLEY		66-05 WOODHAVEN BLVD. STE 2REGO PARK NY 11374	04/20/2017	04/20/2022
DOL	NYC		JOSEPH MARTINO		1535 RICHMOND AVENUE STATEN ISLAND NY 10314	12/13/2017	12/13/2022
DOL	DOL		JOY MARTIN		2404 DELAWARE AVE NIGARA FALLS NY 14305	09/12/2018	09/12/2023
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	NYC		K.S. CONTRACTING CORP.		29 PHILLIP DRIVE PARSIPPANY NJ 07054	02/13/2017	02/13/2022
DOL	DOL		KARIN MANGIN		796 PHELPS ROAD FRANKLIN LAKES NJ 07417	12/01/2020	12/01/2025
DOL	DOL		KATE E. CONNOR		7088 INTERSTATE ISLAND RD SYRACUSE NY 13209	03/31/2021	03/31/2026
DOL	DOL		KATIE BURDICK		2238 BAKER RD GILLET PA 16923	03/12/2018	03/12/2023
DOL	DOL	*****2959	KELC DEVELOPMENT, INC		7088 INTERSTATE ISLAND RD SYRACUSE NY 13209	03/31/2021	03/31/2026
DOL	DOL		KENNETH FIORENTINO		375 LAKE SHORE DRIVE PUTNAM VALLEY NY 10579	01/23/2017	01/23/2022
DOL	DOL		KIMBERLY F. BAKER		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL	*****3490	L & M CONSTRUCTION/DRYWALL INC.		1079 YONKERS AVE YONKERS NY 10704	08/07/2018	08/07/2023
DOL	DA	*****8816	LAKE CONSTRUCTION AND DEVELOPMENT CORPORATION		150 KINGS STREET BROOKLYN NY 11231	08/19/1998	08/19/2998
DOL	DOL	*****4505	LARAPINTA ASSOCIATES INC		29 MAPLEWOOD DRIVE BINGHAMTON NY 13901	02/21/2017	02/21/2022
DOL	DOL		LAVERN GLAVE		161 ROBYN RD MONROE NY 10950	01/30/2018	01/30/2023
DOL	DOL	*****4388	LEN.J CONSTRUCTION, LLC		PO BOX 10007 ALBANY NY 12201	06/24/2016	09/19/2022
DOL	DOL	*****4388	LEN.J CONSTRUCTION, LLC		PO BOX 10007 ALBANY NY 12201	06/24/2016	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	01/17/2017	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

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DOL	DOL	*****4388	LEN.J CONSTRUCTION, LLC		PO BOX 10007 ALBANY NY 12201	08/14/2017	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	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		LEROY NELSON JR		PO BOX 10007 ALBANY NY 12201	01/17/2017	09/19/2022
DOL	DA	*****4460	LONG ISLAND GLASS & STOREFRONTS, LLC		4 MANHASSET TRL RIDGE NY 11961	09/06/2018	09/06/2023
DOL	AG	*****4216	LOTUS-C CORP.		81-06 34TH AVENUE APT. 6EJACKSON HEIGHTS NY 11372	02/07/2018	02/07/2023
DOL	DOL		LOUIS A. CALICCHIA		1223 PARK ST. PEEKSKILL NY 10566	05/17/2021	05/17/2026
DOL	NYC		LUBOMIR PETER SVOBODA		27 HOUSMAN AVE STATEN ISLAND NY 10303	12/26/2019	12/26/2024
DOL	NYC		M & L STEEL & ORNAMENTAL IRON CORP.		27 HOUSMAN AVE STATEN ISLAND NY 10303	12/26/2019	12/26/2024
DOL	DOL		M ANVER BEIG		142 EAST MARKET STREET LONG BEACH NY 11561	03/07/2017	03/07/2022
DOL	DOL		M. ANVER BEIG		142 EAST MARKET STREET LONG BEACH NY 11561	03/07/2017	03/07/2022
DOL	DOL	*****1784	MADISON AVE CONSTRUCTION CORP		39 PENNY STREET WEST ISLIP NY 11795	11/02/2016	11/02/2021
DOL	DOL	*****2196	MAINSTREAM SPECIALTIES, INC.		11 OLD TOWN RD SELKIRK NY 12158	02/02/2021	02/02/2026
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	NYC		MAREK FABIJANOWSKI		50 MAIN ST WHITE PLAINS NY 10606	01/04/2019	01/04/2024
DOL	NYC		MARTINE ALTER		1010 NORTHERN BLVD. GREAT NECK NY 11021	03/09/2017	03/09/2022
DOL	DOL		MARVIN A STURDEVANT		29 MAPLEWOOD DRIVE BINGHAMTON NY 13901	02/21/2017	02/21/2022
DOL	DOL		MASONRY CONSTRUCTION, INC.		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL	*****3333	MASONRY INDUSTRIES, INC.		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	NYC		MATINA KARAGIANNIS		97-18 50TH AVE CORONA NY 11368	04/19/2018	04/19/2023
DOL	DOL		MATTHEW P. KILGORE		4156 WILSON ROAD EAST TABERG NY 13471	03/26/2019	03/26/2024
DOL	DOL		MAURICE GAWENO		442 ARMONK RD MOUNT KISCO NY 10549	06/12/2018	06/12/2023
DOL	DOL		MCLEAN "MIKKI BEANE"		1229 JAMES STREET SYRACUSE NY 13203	05/02/2017	05/02/2022
DOL	DOL		MCLEAN "MIKKI" DRAKE		1229 JAMES STREET SYRACUSE NY 13203	05/02/2017	05/02/2022
DOL	DOL		MCLEAN M DRAKE-BEANE		1229 JAMES STREET SYRACUSE NY 13203	05/02/2017	05/02/2022
DOL	DOL	*****9445	MCLEAN M WALSH	ELITE PROFESSION AL PAINTING OF CNY	1229 JAMES STREET SYRACUSE NY 13203	05/02/2017	05/02/2022
DOL	DOL	*****9445	MCLEAN M WALSH	ELITE PROFESSION AL PAINTING OF CNY	1229 JAMES STREET SYRACUSE NY 13203	05/02/2017	05/02/2022
DOL	DOL		MICHAEL LENIHAN		1079 YONKERS AVE UNIT 4YONKERS NY 10704	08/07/2018	08/07/2023
DOL	AG		MICHAEL RIGLIETTI		31 BAY ST BROOKLYN NY 11231	03/28/2018	03/28/2023
DOL	DOL	*****4829	MILESTONE ENVIRONMENTAL CORPORATION		704 GINESI DRIVE SUITE 29MORGANVILLE NJ 07751	04/10/2019	04/10/2024

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DOL	NYC	*****9926	MILLENNIUM FIRE PROTECTION, LLC		325 W. 38TH STREET SUITE 204NEW YORK NY 10018	11/14/2019	11/14/2024
DOL	NYC	*****0627	MILLENNIUM FIRE SERVICES, LLC		14 NEW DROP LNE 2ND FLOORSTATEN ISLAND NY 10306	11/14/2019	11/14/2024
DOL	NYC	*****3826	MOVING MAVEN OF NY, INC.		1010 NORTHERN BLVD. GREAT NECK NY 11021	03/09/2017	03/09/2022
DOL	NYC	*****3550	MOVING MAVEN, INC		1010 NORTHERN BLVD. GREAT NECK NY 11021	03/09/2017	03/09/2022
DOL	AG		MSR ELECTRICAL CONSTRUCTION CORP.		31 BAY ST BROOKLYN NY 11231	03/28/2018	03/28/2023
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	NYC		MUHAMMED A. HASHEM		524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025
DOL	DA	*****9786	NATIONAL INSULATION & GC CORP		180 MILLER PLACE HICKSVILLE NY 11801	12/12/2018	12/12/2023
DOL	DOL	*****3684	NATIONAL LAWN SPRINKLERS, INC.		645 N BROADWAY WHITE PLAINS NY 10603	05/14/2018	05/14/2023
DOL	NYC		NICHOLAS FILIPAKIS		7113 FORT HAMILTON PARKWA BROOKLYN NY 11228	12/09/2016	12/09/2021
DOL	DOL	*****7429	NICOLAE I. BARBIR	BESTUCCO CONSTRUCTION, INC.	444 SCHANTZ ROAD ALLENTOWN PA 18104	09/17/2020	09/17/2025
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	*****1845	OC ERECTERS, LLC A/K/A OC ERECTERS OF NY INC.		1207 SW 48TH TERRACE DEERFIELD BEACH FL 33442	01/16/2018	01/16/2023
DOL	NYC	*****0818	ONE TEN RESTORATION, INC.		2366 61ST ST BROOKLYN NY 11204	12/15/2016	12/15/2021
DOL	NYC		PARESH SHAH		29 PHILLIP DRIVE PARSIPPANY NJ 07054	02/13/2017	02/13/2022
DOL	DOL		PAULINE CHAHALES		935 S LAKE BLVD MAHOPAC NY 10541	03/02/2021	03/02/2026
DOL	NYC	*****9422	PELIUM CONSTRUCTION, INC.		22-33 35TH ST. ASTORIA NY 11105	12/30/2016	12/30/2021
DOL	DOL		PETER M PERGOLA		3 WEST MAIN ST/SUITE 208 ELMSFORD NY 10523	01/23/2017	01/23/2022
DOL	DOL		PETER STEVENS		11 OLD TOWN ROAD SELKIRK NY 12158	02/02/2021	02/02/2026
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	NYC	*****5771	PMJ ELECTRICAL CORP		7113 FORT HAMILTON PARKWA BROOKLYN NY 11228	12/09/2016	12/09/2021
DOL	DOL	*****0466	PRECISION BUILT FENCES, INC.		1617 MAIN ST PEEKSKILL NY 10566	03/03/2020	03/03/2025
DOL	NYC	*****4532	PROFESSIONAL PAVERS CORP.		66-05 WOODHAVEN BLVD. REGO PARK NY 11374	04/20/2017	04/20/2022
DOL	NYC		RASHEL CONSTRUCTION CORP		524 MCDONALD AVENUE BROOKLYN NY 11218	09/17/2020	09/17/2025
DOL	DOL	*****1068	RATH MECHANICAL CONTRACTORS, INC.		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
DOL	DOL	*****2633	RAW POWER ELECTRIC CORP		3 PARK CIRCLE MIDDLETOWN NY 10940	01/30/2018	01/30/2023
DOL	AG	*****7015	RCM PAINTING INC.		69-06 GRAND AVENUE 2ND FLOORMASPETH NY 11378	02/07/2018	02/07/2023
DOL	DOL		REGINALD WARREN		161 ROBYN RD MONROE NY 10950	01/30/2018	01/30/2023
DOL	DOL	*****9148	RICH T CONSTRUCTION		107 WILLOW WOOD LANE CAMILLUS NY 13031	11/13/2018	11/13/2023
DOL	DOL		RICHARD MACONE		8617 THIRD AVE BROOKLYN NY 11209	09/17/2018	09/17/2023
DOL	DOL		RICHARD REGGIO		1617 MAIN ST PEEKSKILL NY 10566	03/03/2020	03/03/2025

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DOL	DOL	*****9148	RICHARD TIMIAN	RICH T CONSTRUCTI ON	108 LAMONT AVE SYRACUSE NY 13209	10/16/2018	10/16/2023
DOL	DOL		RICHARD TIMIAN JR.		108 LAMONT AVE SYRACUSE NY 13209	10/16/2018	10/16/2023
DOL	DOL		RICHARD TIMIAN JR.		108 LAMONT AVE SYRACUSE NY 13209	11/13/2018	11/13/2023
DOL	DOL		ROBBYE BISSEsar		89-51 SPRINGFIELD BLVD QUEENS VILLAGE NY 11427	01/11/2003	01/11/3003
DOL	DOL		ROBERT A. VALERINO		3841 LANYARD COURT NEW PORT RICHEY FL 34652	07/09/2019	07/09/2024
DOL	DOL		ROBERT BRUNO		3 GAYLORD ST AUBURN NY 13021	11/15/2016	11/15/2021
DOL	DOL		ROBERT BRUNO		5 MORNINGSIDE DRIVE AUBURN NY 13021	05/28/2019	05/28/2024
DOL	NYC		ROBERT HOHMAN		149 FIFTH AVE NEW YORK NY 10010	12/29/2016	12/29/2021
DOL	DOL		RODERICK PUGH		404 OAK ST SUITE 101SYRACUSE NY 13203	07/23/2018	07/23/2023
DOL	DOL	*****4880	RODERICK PUGH CONSTRUCTION INC.		404 OAK ST SUITE 101SYRACUSE NY 13203	07/23/2018	07/23/2023
DOL	DOL		ROMEO WARREN		161 ROBYN RD MONROE NY 10950	01/30/2018	01/30/2023
DOL	DOL		RONALD MESSEN		14B COMMERCIAL AVE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	DOL		ROSEANNE CANTISANI			06/12/2018	06/12/2023
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	*****1365	S & L PAINTING, INC.		11 MOUNTAIN ROAD P.O BOX 408MONROE NY 10950	03/20/2019	03/20/2024
DOL	DOL	*****7730	S C MARTIN GROUP INC.		2404 DELAWARE AVE NIAGARA FALLS NY 14305	09/12/2018	09/12/2023
DOL	NYC	*****0349	SAM WATERPROOFING INC		168-42 88TH AVENUE APT.1 AJAMAICA NY 11432	11/20/2019	11/20/2024
DOL	NYC		SANDEEP BOPARAI		185-06 56TH AVE FRESH MEADOW NY 11365	10/17/2017	10/17/2022
DOL	DOL	*****9751	SCW CONSTRUCTION		544 OLD ROUTE 23 ACRE NY 12405	02/14/2017	02/14/2022
DOL	NYC	*****6597	SHAIRA CONSTRUCTION CORP.		421 HUDSON STREET SUITE C5NEW YORK NY 10014	02/20/2019	02/20/2024
DOL	DOL	*****1961	SHANE BURDICK	CENTRAL TRAFFIC CONTROL, LLC.	2238 BAKER ROAD GILLET PA 16923	03/12/2018	03/12/2023
DOL	DOL		SHANE BURDICK		2238 BAKER ROAD GILLET PA 16923	03/12/2018	03/12/2023
DOL	DOL		SHANE NOLAN		9365 WASHINGTON ST LOCKPORT IL 60441	07/23/2018	07/23/2023
DOL	DOL		SHULEM LOWINGER		11 MOUNTAIN ROAD 28 VAN BUREN DRMONROE NY 10950	03/20/2019	03/20/2024
DOL	DOL	*****0816	SOLAR ARRAY SOLUTIONS, LLC		9365 WASHINGTON ST LOCKPORT IL 60441	07/23/2018	07/23/2023
DOL	DOL	*****0440	SOLAR GUYS INC.		8970 MIKE GARCIA DR MANASSAS VA 20109	07/16/2021	07/16/2026
DOL	DOL	*****2221	SOUTH BUFFALO ELECTRIC, INC.		1250 BROADWAY ST BUFFALO NY 14212	02/03/2020	02/03/2025
DOL	DOL	*****3496	STAR INTERNATIONAL INC		89-51 SPRINGFIELD BLVD QUEENS VILLAGE NY 11427	08/11/2003	08/11/3003
DOL	DOL	*****6844	STEAM PLANT AND CHX SYSTEMS INC.		14B COMMERCIAL AVENUE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	DOL	*****9933	STEED GENERAL CONTRACTORS, INC.		1445 COMMERCE AVE BRONX NY 10461	05/30/2019	05/30/2024
DOL	DOL	*****9528	STEEL-IT, LLC.		17613 SANTE FE LINE ROAD WAYNESFIELD OH 45896	07/16/2021	07/16/2026
DOL	DOL		STEFANOS PAPASTEFANOu, JR. A/K/A STEVE PAPASTEFANOu, JR.		256 WEST SADDLE RIVER RD UPPER SADDLE RIVER NJ 07458	05/30/2019	05/30/2024
DOL	DOL	*****9751	STEPHEN C WAGAR		544 OLD ROUTE 23 ACRE NY 12405	02/14/2017	02/14/2022

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DOL	DOL		STEVE TATE		415 FLAGER AVE #302STUART FL 34994	10/31/2018	10/31/2023
DOL	NYC		STEVEN GOVERNALE		601 PORTION RD RONKONKOMA NY 11779	11/18/2016	11/18/2021
DOL	DOL		STEVEN MARTIN		2404 DELWARE AVE NIAGARA FALLS NY 14305	09/12/2018	09/12/2023
DOL	DOL		STEVEN TESTA		50 SALEM STREET - BLDG B LYNNFIELD MA 01940	01/23/2017	01/23/2022
DOL	NYC	*****5863	SUKHMAN CONSTRUCTION, INC.		185-06 56TH AVE FRESH MEADOW NY 11365	10/17/2017	10/17/2022
DOL	DOL	*****1060	SUNN ENTERPRISES GROUP, LLC		370 W. PLEASANTVIEW AVE SUITE 2.329HACKENSACK NJ 07601	02/11/2019	02/11/2024
DOL	DOL	*****8209	SYRACUSE SCALES, INC.		158 SOLAR ST SYRACUSE NY 13204	01/07/2019	01/07/2024
DOL	DOL		TALAILA OCAMPA		1207 SW 48TH TERRACE DEERFIELD BEACH FL 33442	01/16/2018	01/16/2023
DOL	DOL		TERRY THOMPSON		11371 RIDGE RD WOLCOTT NY 14590	02/03/2020	02/03/2025
DOL	DOL		TEST		P.O BOX 123 ALBANY NY 12204	05/20/2020	05/20/2025
DOL	DOL	*****6789	TEST1000		P.O BOX 123 ALBANY NY 12044	03/01/2021	03/01/2026
DOL	DOL	*****5570	TESTA CORP		50 SALEM STREET - BLDG B LYNNFIELD MA 01940	01/23/2017	01/23/2022
DOL	DOL	*****5766	THE COKER CORPORATION	COKER CORPORATIO N	2610 SOUTH SALINA ST SUITE 14SYRACUSE NY 13205	12/04/2018	12/04/2023
DOL	DOL	*****5766	THE COKER CORPORATION	COKER CORPORATIO N	2610 SOUTH SALINA ST SUITE 14SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL	*****8311	TRIPLE B FABRICATING, INC.		61 WILLETT ST. PASSAIC NJ 07503	10/26/2016	10/26/2021
DOL	DOL	*****6392	V.M.K CORP.		8617 THIRD AVE BROOKLYN NY 11209	09/17/2018	09/17/2023
DOL	DOL	*****6418	VALHALLA CONSTRUCTION, LLC.		796 PHLEPS ROAD FRANKLIN LAKES NJ 07417	12/01/2020	12/01/2025
DOL	NYC	*****7361	VIABLE HOLDINGS, INC.	MOVING MAVEN	1010 NORTHERN BLVD. GREAT NECK NY 11021	03/09/2017	03/09/2022
DOL	DOL		VICTOR ALICANTI		42-32 235TH ST DOUGLSTON NY 11363	01/14/2019	01/14/2024
DOL	NYC		VIKTAR PATONICH		2630 CROPSEY AVE BROOKLYN NY 11214	10/30/2018	10/30/2023
DOL	DOL		VIKTORIA RATH		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
DOL	NYC		VITO GARGANO		1535 RICHMOND AVE STATEN ISLAND NY 10314	12/13/2017	12/13/2022
DOL	NYC	*****3673	WALTERS AND WALTERS, INC.		465 EAST AND THIRD ST MT. VERNON NY 10550	09/09/2019	09/09/2024
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	*****3296	WESTERN NEW YORK CONTRACTORS, INC.		3841 LAYNARD COURT NEW PORT RICHEY FL 34652	07/09/2019	07/09/2024
DOL	DOL		WHITE PLAINS CARPENTRY CORP		442 ARMONK RD	06/12/2018	06/12/2023
DOL	DOL		WILLIAM C WATKINS		1229 JAMES STREET SYRACUSE NY 13203	05/02/2017	05/02/2022
DOL	DOL		WILLIAM DEAK		C/O MADISON AVE CONSTR CO 39 PENNY STREETWEST ISLIP NY 11795	11/02/2016	11/02/2021
DOL	DOL	*****4043	WINDSHIELD INSTALLATION NETWORK, INC.		200 LATTA BROOK PARK HORSEHEADS NY 14845	03/08/2018	03/08/2023
DOL	DOL	*****4730	XGD SYSTEMS, LLC	TDI GOLF	415 GLAGE AVE #302STUART FL 34994	10/31/2018	10/31/2023
DOL	NYC		ZAKIR NASEEM		30 MEADOW ST BROOKLYN NY 11206	10/10/2017	10/10/2022
DOL	NYC	*****8277	ZHN CONTRACTING CORP		30 MEADOW ST BROOKLYN NY 11206	10/10/2017	10/10/2022

Exhibit B

Davis-Bacon Wage Rates

"General Decision Number: NY20210017 10/22/2021

Superseded General Decision Number: NY20200017

State: New York

Construction Types: Building, Heavy, Highway and Residential

County: Westchester County in New York.

BUILDING CONSTRUCTION PROJECTS, RESIDENTIAL CONSTRUCTION PROJECTS (consisting of single family homes and apartments up to and including 4 stories), AND HEAVY AND HIGHWAY CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.95 for calendar year 2021 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.95 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2021. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/01/2021
1	03/12/2021
2	04/02/2021
3	04/16/2021
4	05/21/2021
5	06/04/2021
6	06/25/2021
7	07/02/2021
8	07/23/2021
9	09/10/2021
10	10/08/2021
11	10/15/2021
12	10/22/2021

ASBE0091-003 06/01/2020

Rates Fringes

HAZARDOUS MATERIAL HANDLER
(Duties limited to
preparation, wetting,

stripping, removal, scraping,
vacuuming, bagging and
disposing of all insulation
materials whether they
contain asbestos or not from
mechanical systems).....\$ 43.12 42.35
Insulator/asbestos worker
(Includes application of all
insulating materials,
protective coverings,
coatings, and finishes to all
types of mechanical systems).....\$ 43.12 42.35

BOIL0005-001 01/01/2021

Rates Fringes

BOILERMAKER.....\$ 63.38 33%+47.22+a

FOOTNOTE:

a. PAID HOLIDAYS: New Year's Day, Thanksgiving Day, Memorial
Day, Independence Day, Labor Day and Good Friday, Friday
after Thanksgiving, Christmas Eve Day and New Year's Eve

BRNY0001-003 06/01/2018

Rates Fringes

Pointer, cleaner and caulker.....\$ 41.96 33.38

BRNY0004-001 07/05/2021

Rates Fringes

MARBLE MASON.....\$ 61.73 37.91

BRNY0005-006 06/01/2021

HEAVY & HIGHWAY CONSTRUCTION

Rates Fringes

BRICKLAYER

Bricklayers, Stone Masons,
Cement Masons, Plasterers,
Pointers, Caulkers and
Cleaner.....\$ 43.85 36.55

BRNY0005-007 06/01/2019

BUILDING/RESIDENTIAL CONSTRUCTION

Rates Fringes

Bricklayer, Cement Mason,
Plasterer & Stonemason.....\$ 42.09 34.50

BRNY0007-001 07/01/2021

Rates Fringes

TERRAZZO FINISHER.....\$ 55.21 36.97
TERRAZZO WORKER/SETTER.....\$ 58.46 38.09

BRNY0007-002 06/01/2021

	Rates	Fringes
TILE FINISHER.....	\$ 47.26	32.61

BRNY0020-001 07/05/2021

	Rates	Fringes
MARBLE FINISHER.....	\$ 48.87	35.40

BRNY0024-001 01/01/2018

	Rates	Fringes
BRICKLAYER MARBLE POLISHERS.....	\$ 40.89	26.69

BRNY0052-001 12/02/2019

	Rates	Fringes
Tile Layer.....	\$ 59.73	35.37

CARP0279-001 07/01/2021

	Rates	Fringes
Carpenters:		
Building.....	\$ 45.32	31.38
Heavy & Highway.....	\$ 45.32	31.38
Residential.....	\$ 29.48	20.41

CARP0740-001 07/01/2021

	Rates	Fringes
MILLWRIGHT.....	\$ 57.00	54.06

CARP1556-007 07/01/2021

	Rates	Fringes
Diver Tender.....	\$ 51.34	52.79
Diver.....	\$ 71.80	52.79

CARP1556-009 07/01/2021

	Rates	Fringes
Dock Builder & Piledrivermen.....	\$ 56.93	52.79

CARP1556-011 07/01/2021

	Rates	Fringes
Carpenters:		
TIMBERMEN.....	\$ 52.05	52.24

CARP2287-001 07/01/2021

	Rates	Fringes
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Carpenters:

Soft Floor Layers.....	\$ 54.75	46.43
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ELEC0003-003 04/28/2016

	Rates	Fringes
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ELECTRICIAN (Teledata Technician).....	\$ 50.75	43.704
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a. \$2.00 per hour not to exceed \$14.00 per day.

ELEC1249-001 05/03/2021

	Rates	Fringes
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ELECTRICIAN (LIGHTING AND TRAFFIC SIGNAL WORK Including any and all Fiber Optic Cable necessary for Traffic Signal Systems, Traffic monitoring systems and Road Weather Information systems)

Flagman.....	\$ 28.29	7%+35.40
Ground Digging Machine Operator.....	\$ 42.44	7%+35.40
Ground Truck Driver.....	\$ 37.72	7%+35.40
Tractor, Trailer Unit.....	\$ 40.08	7%+35.40
Lineman & Technician.....	\$ 47.15	7%+35.40
Mechanic.....	\$ 37.72	7%+35.40

FOOTNOTE:

a. PAID HOLIDAYS: New Years Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day, President's Day, Good Friday, Decoration Day, Election Day for the President of the United States and Election Day for the Governor of the State of New York provided the employee works two days before and two days after the holiday

ELEC1249-006 05/03/2021

	Rates	Fringes
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ELECTRICIAN (LINE CONSTRUCTION)

Substation and switching structures pipetype cable, underground fluid and gas filled transmission conduit and cable installation, fiber optic ground wire, fiber optic shield wire or any other like product having ground protection or fiber optic capabilities, maintenance jobs or projects; rail-road catenary installation and maintenance bonding of rails; Overhead & underground distribution work & Maintenance; Overhead and under- ground

transmission line work:

Cable Splicer.....	\$ 63.48	7%+35.40
Flagman.....	\$ 34.63	7%+34.40
Groundman digging machine operator.....	\$ 51.94	7%+34.40
Groundman truck driver (tractor trailer unit).....	\$ 49.05	7%+34.40
Groundman truck driver;....	\$ 46.17	7%+34.40
Lineman & Technician.....	\$ 57.71	7%+35.40
Mechanic.....	\$ 46.17	7%+34.40

PAID HOLIDAYS:

a. New Year's Day, President's Day, Memorial Day, Good Friday, Independence Day, Labor Day, Thanksgiving Day, Christmas Day, and Election Day for the President of the United States and Election Day for the Governor of New York State, provided the employee works two days before or two days after the holiday.

ELEC1249-009 01/01/2021

	Rates	Fringes
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ELECTRICIAN (LINE
CONSTRUCTION)

TELEPHONE, CATV
FIBEROPTICS CABLE AND
EQUIPMENT

Cable Splicer.....	\$ 34.78	3%+5.14
Groundman.....	\$ 17.50	3%+5.14
Installer Repairman- Teledata Lineman/Technician- Equipment Operator.....	\$ 33.01	3%+5.14

ELEV0001-002 03/17/2018

	Rates	Fringes
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ELEVATOR MECHANIC

Elevator Constructor.....	\$ 64.48	36.21+a+b
Modernization and Repair....	\$ 50.49	40.399+a+b

FOOTNOTE:

a. PAID HOLIDAYS: New Year's Day, Good Friday, President's Day, Memorial Day, Independence Day, Labor Day, Columbus Day, Veteran's Day, Thanksgiving Day, Friday after Thanksgiving, and Christmas Day.

b. PAID VACATION: An employee who has worked less than 5 years shall receive vacation pay credit on the basis of 4% of his hourly rate for all hours worked; an employee who has worked 5 to 15 years shall receive vacation pay credit on the basis of 6% of his hourly rate for all hours worked; an employee who has worked 15 or more years shall receive vacation pay credit on the basis of 8% of his hourly rate for all hours worked.

ELEV0138-003 01/01/2020

WESTCHESTER COUNTY (Towns of Bedford, Cortland, Lewisboro, Mt.

Kisco, North Salem, Pound Ridge, Somers, and Yorktown)

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 60.49	34.765+a+b

FOOTNOTE:

a. Vacation: 6%/under 5 years based on regular hourly rate for all hours worked. 8%/over 5 years based on regular hourly rate for all hours worked.

b. PAID HOLIDAYS: New Year's Day; Memorial Day; Independence Day; Labor Day; Veterans' Day; Thanksgiving Day; the Friday after Thanksgiving Day; and Christmas Day.

ENGI0137-005 03/06/2017

BUILDING & RESIDENTIAL CONSTRUCTION

	Rates	Fringes
Power equipment operators:		
GROUP 1-A.....	\$ 53.95	28.52+a
GROUP 1-B.....	\$ 49.68	28.52+a
GROUP 2-A.....	\$ 52.03	28.52+a
GROUP 3-A.....	\$ 50.11	28.52+a
GROUP 3-B.....	\$ 47.67	28.52+a
GROUP 4-A.....	\$ 49.60	28.52+a
GROUP 4-B.....	\$ 41.85	28.52+a
GROUP 5.....	\$ 45.17	28.52+a
GROUP 5-A.....	\$ 56.63	28.52+a
GROUP 5-B.....	\$ 42.83	28.52+a
GROUP 6.....	\$ 44.92	28.52+a

NOTES: Hazmat: 20% above regular rate
Pumping operation Premium .50

Crane Operators (100-149 ft) 2.00

Crane Operators (149 ft +) 3.00

Loader Operators (over 5 cu y) .50

Shovel Operators (over 4 cu yd) 1.00

FOOTNOTE:

a. New Years Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day, plus Lincoln's Birthday, Washington's Birthday, Good Friday, Columbus Day, November Election Day, Veteran's Day.

POWER EQUIPMENT OPERATORS CLASSIFICATION

GROUP 1-A: Carrier- trailer horse; concret-portable hoist; crane & hoist engineer-steel (concrete, material, super structure sub- structure); derrick (stone-steel); elevator & cage; hoist- single/double or triple drum; hoist-portable mobile unit; hoist engineer-concert (crane-derrick-mine hoist); hoist engineer- material; overhead crane; power house plant; telephies (cableway); whirly; maintenance engineer; Lull hiliift or similar; hydraulic crane 25 ton and over; cherry picker 25 tons and over; backhoe Oliver 88; fordson; dynahoe; dual purpose and similar machines; Barber Green Loader-euclid loader or similar type; conway or similar mucking macking machines; dragline; gradall;

shovel; backhoe etc. (crawler or truck); front end loaders; hydraulic boom; jersey spreader; lift slab console; letournequ or tounapull (scrapers over 20 yds struck); mucking machines; pavement breaker (air ram); paver (concrete); road boring machine; road mix machines; ross carrier and similar machines; post hole digger; shovel (tunnels); side boom; spreader (asphalt); scoopmobile-tractor-shovel over 1 1/2 yds. trenching machines vermeer concrete saw trencher and similar; tractor type demolition equipment; winch truck (a frame); hydraulic crane over 10 ton up to 25 ton); cherry picker over 10 ton up to 25 ton)

GROUP 1-B: Compressor (steel erection); pulse meter and push button buzz box; elevator; mechanic (outside) all types; welder; scrapers 20 yds struck and under; machine pulling sheep's foot roller; vibratory rollers; roller 4 tons and over.

GROUP 2-A: Compactor self-propelled; grader; bulldoze D7 and similar tractors with a draw bar horsepower of 100 or over; bulldozer D6 and under; welder; scraper 20 yds struck and under; machine pulling sheep's foot roller; vibratory rollers.

GROUP 3-A: Asphalt plant; boiler (high pressure); concrete mixing plants; concrete pump; firemen; forklift; forklift (electric); joy drill or similar tractor drilling machine; loader - 1 1/2 yards and under; locomotive (all sizes); mixer concrete - 21E and over; portable asphalt plant; portable batch plant; portable crusher; quarry master; stone crusher; well drilling machine and well point system; cherry picker under 10 tons; hydraulic crane under 10 tons; concert buffy; one yard an up ride on dumper (benford or similar).

GROUP 3-B: Compressor over 125 cu. feet; conveyor belt machine regardless of size; lighting unit (portable & generator); welding machine (steel erection and excavation); and compressor plant; stud machine; ladder hoist.

GROUP 4-A: Air tractor drill; batch plant; bending machine; concrete breaker; concrete spreader; curb cutter machine; farm tractor (all types); finishing machine-concrete; hepavac clean air machine (all similar types: removal of asbestos etc.); material hopper-sand-stone-cement; mixer-concrete-under 21E; mulching grass spreader; pump-gypsum, etc., pump-plaster-grout -fireproofing; shop mechanic (not employed on job site); roller under 4 ton; spreading and fine grading machine; steel cutting machine; syphon pump-air-steam; tar joint machine; turbo jet burner or similar equipment; vibrator (1 to 5); fine grading machine; roof hoist (tugger hoist); television cameras-water- sewer-gas-etc.

GROUP 4-B: Compressor to 125 feet; dust; dust collector; heater all types; pump; pump station (water and sewer); steam jenny; sweeper; chipper; mulcher.

GROUP 5: Motorized roller (walk behind)

GROUP 5-A: Master Mechanic

GROUP 5-B: Utility Man

GROUP 6: Warehouse Man

ENGI0137-006 03/06/2017

HEAVY & HIGHWAY

	Rates	Fringes
Power equipment operators:		
GROUP 1.....	\$ 58.54	28.15+a
GROUP 1-A.....	\$ 51.68	28.15+a
GROUP 1-B.....	\$ 54.42	28.15+a
GROUP 2-A.....	\$ 49.52	28.15+a
GROUP 2-B.....	\$ 51.05	28.15+a
GROUP 3.....	\$ 48.67	28.15+a
GROUP 4-A.....	\$ 44.29	28.15+a
GROUP 4-B.....	\$ 38.13	28.15+a
GROUP 5.....	\$ 54.69	28.15+a
GROUP 5-A-1.....	\$ 54.69	28.15+a
GROUP 5-A-2.....	\$ 66.22	28.15+a
GROUP 5-A-3.....	\$ 63.97	28.15+a
GROUP 5-A-4.....	\$ 60.03	28.15+a
GROUP 5-A-5.....	\$ 50.65	28.15+a

POWER EQUIPMENT OPERATORS CLASSIFICATIONS (HEAVY & HIGHWAY)

GROUP 1: Boom Truck; Cherry Picker; Clamshell; Crane,
(Crawler, Truck); Dragline; Rough Terrain Crane

GROUP 1-A: Auger; Auto Grader; Dynahoe and Dual purpose and similar machines; Boat Captain; Boring Machine (all types); Bull Dozer-all sizes; Central Mix Plant Operator; Chipper-all types; Close circuit t.v.; Compactor with Blade; Concrete Portable Hoist; C.M.I. or similar; Conway or similar mucking machines; Gradall, Shovel Backhoe, etc. Grader; Derrick, (Stone- Steel; Elevator & cage, materials or passengers; Front end loaders over 1 1/2 yds.; Hoist Single, Double, Triple Drum, Hoist Portable Mobile Unit; Hoist Engineer-Concrete (Crane-Derrick-Mine Hoist); Hoist Engineer-Material, Hydraulic Boom; Letourneau or Tournapull (Scrapers over 20 yds. struck); Log Skidder; Movable Concrete Barrier Transfer & Transport Vehicle; mucking machines; overhead crane; paver (concrete); pulsemeter; push button (buzz box) elevator; road mix machines; Robot Hammer (brock or similar), Ross carrier and similar machines; shovels (tunnels); side boom; Slip Form Machine; spreader (asphalt); scoopmobile-tractor-shovel over 1 1/2 yards; trenching machines; telephies- vermeer concrete saw trencher and/or similar; tractor-type demolition equipment, Whirly

GROUP 1-B: Road Paver, Asphalt

GROUP 2-A: Ballast Regulators; Compactor self-propelled; Cow Tracks; Fusion Machine; Rail Anchor Machines; Roller 4 ton and over; Scrapers - 20 yards struck; Switch Tampers; Vibratory roller, etc.

GROUP 2-B: Mechanic (outside) all types

GROUP 3-A: Air tractor drill; asphalt plant; batch plant; boiler (high pressure; concrete breaker; concrete pump concrete spreader; curb cutter machine; farm tractor (all

types); finishing machine (concrete); fine grading machine; fireman; forklift; forklift (electric); joy drill or similar tractor drilling machine; loader - 1 1/2 yards and under; locomotive (all sizes), maintenance engineer; machine pulling sheeps foot roller; material hopper; mixer concrete - 21-E and over; mulching grass spreader; portable asphalt plant, portable batch plant, portable crusher; powerhouse plant; quarry master; roller under 4 ton; spreading and fine grading machine; steel cutting machine; stone crusher; sweeper; turbojet burner or similar; well drilling machine ; winch truck ""A"" frame. John Henry Drill or similar.

GROUP 4-A: Service men (fuel or grease truck).

GROUP 4-B: Oiler; Compressor - compressor plant; paint compressor-steel erection; conveyor belt machine; lighting unit (portable & generator); oiler; pumps - pump station-water-sewer- gypsum- plaster, etc.; roller-motorized (walk-behind); welding machine (steel erection excavation); well point system; bending machine; dust collector; mixer - concrete under 21-E; heater all types; steam jenny; syphon pump-air-steam; tar joint machine; vibrator (1 to 5); Compressor Truck Mounted (2-6)

GROUP 5: Oiler

GROUP 5-A-1: Master Mechanic

GROUP 5-A-2: Engineer - all tower cranes, all climbing cranes and all cranes of 100 ton capacity or greater (3900 Manitowac or similar) irrespective of manufacturer and regardless of how the same is rigged (except for pile rigs).

GROUP 5-A-3: Engineer-- Pile Driver

GROUP 5-A-4: Hoist Engineer- Steel -Sub Structure

GROUP 5-A-5: Jersey-spreader, pavement breaker (air ram); Post Hole Digger

NOTES:

Loader Operator (over 5 cu yds)	.50
Shoval Operators (over 4 cu yd)	1.00
Hazmat premium over regular rate	20%

CRANES:

100 ft- 149 ft: receive \$2.00 more than Group 1 rate
149 ft and over receive \$3.00 more than Group 1 rate

FOOTNOTE:

a. PAID HOLIDAYS: New Year's Day; Lincoln's Birthday; Good Friday; Memorial Day; Independence Day; Labor Day; Veterans Day; Columbus Day; November Election Day; Thanksgiving Day; and Christmas Day

IRON0040-001 07/01/2020

WESTCHESTER COUNTY

	Rates	Fringes
IRONWORKER, STRUCTURAL.....	\$ 52.70	80.24

* IRON0046-003 07/01/2021

	Rates	Fringes
IRONWORKER		
METALLIC LATHERS AND		
REINFORCING IRONWORKERS.....	\$ 56.90	26.30

* IRON0197-001 07/01/2021

	Rates	Fringes
IRONWORKER		
STONE DERRICKMAN.....	\$ 55.63	55.10

* IRON0580-001 07/01/2021

	Rates	Fringes
IRONWORKER, ORNAMENTAL.....	\$ 46.15	59.79

LAB00060-002 03/31/2019

HEAVY/HIGHWAY

	Rates	Fringes
Laborers:		
GROUP 1.....	\$ 42.17	22.23+a
GROUP 2.....	\$ 40.82	22.23+a
GROUP 3.....	\$ 40.42	22.23+a
GROUP 4.....	\$ 40.07	22.23+a
GROUP 5.....	\$ 39.72	22.23+a
GROUP 6.....	\$ 33.37	22.23+a
GROUP 7.....	\$ 41.72	22.23+a
SHAFT AND TUNNEL IN FREE		
AIR		
GROUP 1.....	\$ 48.15	29.25+a
GROUP 2.....	\$ 50.30	29.25+a
GROUP 4.....	\$ 56.70	29.25+a

LABORERS CLASSIFICATIONS (HEAVY/HIGHWAY):

GROUP 1: Blasters.

GROUP 2: Burner, Jumbo Driller, Joy Driller, Wagon Driller, Air Track Driller, Hydraulic Driller, Concrete Form Aligner, Concrete Form and Curb Form Highway (Steel), Asphalt Screedman, Asphalt Raker.

GROUP 3: Asphalt Curb Machine Operator, Jeeper Operator, Pavement Breaker Operator, Power Saw Operator, Jack Hammer Driller. All types of pneumatic tools gasoline driller, concrete saw, gunniting, railroad spike puller and sandblasting, pipe layer, deck winches on scows, power buggy operator, power wheelbarrow operator.

GROUP 4: General concrete laborers-anything pertaining to concrete, aggregate or concrete material handling, puddlers, asphalt worker, rock scalers, vibrator operator, bit grinder, concrete grinder, air tampers and all tampers not covered by any other classification, form pin puller, pumps and their operation, service of air power, epoxy and waterproofing worker, fine grade person between forms, barco rammer, guard and guide rail and link fence, steel kings.

GROUP 5: Common laborers, signal person and pit person, truck spotters, powder person, landscape and nursery person, dump person.

GROUP 6: Flagperson

GROUP 7: Asbestos and Toxic Waste laborer

SHAFT AND TUNNEL IN FREE AIR CLASSIFICATIONS

GROUP 1: Outside laborers

GROUP 2: Blaster, Concrete and form setters, drill runners, air tuggers, chippers, pneumatic tools, and source of airpower, pumps and their operations, vibrator operators, Puddlers, Chuck tenders, nippers, concrete laborers tunnel sewer and water pipeliners, boring, Laborers, Powder carriers, signalmen, and Brakemen

GROUP 4: Miners

FOOTNOTE: a. PAID HOLIDAYS: New Year's Day, Lincoln's Birthday, Washington's Birthday, Good Friday, Memorial Day, Independence Day, Labor Day, Columbus Day, November Election Day, Veterans' Day, Thanksgiving Day and Christmas Day.

LAB00235-001 05/01/2016

BUILDING

	Rates	Fringes
LABORER.....	\$ 33.30	26.25

LAB00235-002 05/01/2016

RESIDENTIAL

	Rates	Fringes
LABORER.....	\$ 26.80	19.55

PAIN0009-003 05/01/2020

	Rates	Fringes
PAINTER		
GLAZIERS.....	\$ 46.55	44.77
Painters, Paperhanger, Drywall Finishers & Lead		
Abatement Worker.....	\$ 45.70	27.67
Spray, Scaffold,		
Sandblasting.....	\$ 48.70	27.67

PAIN0806-001 10/01/2021

	Rates	Fringes
Painters:		
Structural Steel and Bridge.	\$ 53.00	51.23

PLUM0021-003 05/01/2021

	Rates	Fringes
Plumber and Steamfitter		
Zone 1.....	\$ 59.01	39.26

ROOF0008-003 07/01/2020

	Rates	Fringes
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ROOFER.....	\$ 44.25	34.87
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SFNY0669-002 04/01/2021

	Rates	Fringes
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SPRINKLER FITTER.....	\$ 47.19	28.09
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SHEE0038-001 07/01/2021

	Rates	Fringes
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Sheet metal worker.....	\$ 47.52	44.20
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TEAM0456-001 07/01/2018

HEAVY & HIGHWAY CONSTRUCTION

	Rates	Fringes
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Truck drivers:

GROUP 1.....	\$ 43.47	29.17+a
GROUP 2.....	\$ 40.72	29.17+a
GROUP 3.....	\$ 41.17	29.17+a
GROUP 4.....	\$ 41.34	29.17+a
GROUP 5.....	\$ 40.72	29.17+a
GROUP 6.....	\$ 41.47	29.17+a
GROUP 7.....	\$ 42.22	29.17+a
GROUP 8.....	\$ 42.59	29.17+a
GROUP 9.....	\$ 42.09	29.17+a
GROUP 10.....	\$ 42.72	29.17+a
GROUP 11.....	\$ 42.47	29.17+a

Hazardous/Toxic Waste - An additional 20% of the basic hourly wage rate set forth in this wage determination.

CLASSIFICATION DESCRIPTIONS

GROUP 1: Lowboy (carrying equipment)
 GROUP 2: Straight jobs: 6-Wheeler, 10-Wheeler, A-Frame Trucks (inside cab), Winch Truck (inside cab), Dynamite Truck, Seeding Truck, Mulching Truck, Agitator Truck, Water Truck, Cement Trucks (all types), Suburbans, Station Wagons, Cars, Pickups.
 GROUP 3: Fuel and tire trucks.
 GROUP 4: Tractor trailers (all types)
 GROUP 5: 14 Wheeler
 GROUP 6: Athey wagon, Belly dumps, Articulated Dumps, Trailer wagons.
 GROUP 7: Darts.
 GROUP 8: RXS
 GROUP 9: Off Road Equipment (Under 40 Tons): Euclid
 GROUP 10: Off Road Equipment (Over 40 Tons) Euclid, DJB
 GROUP 11: Off Road Equipment (Under 40 Tons) DJB

a. PAID HOLIDAYS: New Year's Day, Lincoln's Birthday, President's Day, Decoration Day, Independence Day, Labor Day, November Election Day, Thanksgiving Day, Day after Thanksgiving and Christmas Day, provided employee works two or more days in the calendar week in which the holiday falls.

PAID VACATION: 4 weeks paid vacation after 20 years of service and 30 days of employment in current contract year;

3 weeks after 10 years of seniority service; 3 weeks after 10 years and 60 days of employment in contract year, 3 weeks and 1 day after 16 years of seniority service, 3 weeks and 2 days after 17 years of seniority service; 3 weeks and 3 days after 18 years of seniority service; 3 weeks and 4 days after 19 years of seniority service; The third week and every additional day shall be granted to employee in the calendar year in which he completes his tenth or other years of seniority service; 2 weeks after 130 days of employment in the calendar year; 2 weeks after 5 years and 90 days seniority service in calendar year; 1 week and 1 additional day for each additional 18 days of employment not exceeding 10 days in any one calendar year after 90 days of employment. Casual employees 1 day for every 18 days of employment. An employee who does not qualify for vacation shall be paid pro rata on a daily basis. Holiday shall be counted as days worked for vacation benefits.

LEGAL SERVICES FUND: Employer shall contribute \$.20 to the fund on the same basis for all hours paid to employees in the form of holiday pay or vacation pay. In addition to the benefits paid for Health-Welfare and Pension for up to 40 hours worked an additional \$.25 is paid for each hour worked. The employer shall grant 3 calendar days off without loss of pay to an employee who has death in his/her immediate family, inclusive of the day of the funeral.

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage

determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

=====
END OF GENERAL DECISION"

Exhibit C

EFC Mandatory Terms & Conditions



Program Requirements and Bid Packet for Contracts Funded with the NYS Clean Water State Revolving Fund or Drinking Water State Revolving Fund

Recipient to Identify Contract Type:

☐ **Construction**

☐ **Treatment Works and Drinking Water Projects**

☐ **Non-Treatment Works**

☐ **Non-Construction**

Effective October 1, 2020

New York State Environmental Facilities Corporation
625 Broadway, Albany, NY 12207-2997
P: (518) 402-6924 F: (518) 402-7456
www.efc.ny.gov

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PART 1: HOW TO USE THIS DOCUMENT

The New York State Environmental Facilities Corporation (“EFC”) implements the New York State Revolving Fund (“SRF”) for both Clean Water and Drinking Water projects.

This Program Requirements and Bid Packet for Contracts document contains (1) a brief description of New York State and federal program requirements for Contracts and Subcontracts funded in whole or part by the New York State Clean Water and Drinking Water SRFs, (2) required language for such Contracts and Subcontracts to satisfy the SRF program requirements, including required forms, and (3) guidance materials to assist entities in complying with these requirements.

PROGRAM REQUIREMENTS

The following requirements apply projects funded with the NYS Clean Water State Revolving Fund or Drinking Water State Revolving Fund:

- Participation of Minority- and Women-Owned Business Enterprises (“MWBE”) and Equal Employment Opportunities (“EEO”) pursuant to New York State Executive Law, Article 15-A and New York Code of Rules and Regulations, Title 5 (5 NYCRR) Parts 140-145 (Regulations of the Commissioner of Economic Development);
- Equal Employment Opportunities pursuant to Titles VI and VII of the Civil Rights Act of 1964, 40 CFR Part 7, and 41 CFR Part 60-1 Subpart A;
- Affirmative Action requirements pursuant to 41 CFR Part 60-4;
- Non-discrimination requirements pursuant to Section 504 of the Rehabilitation Act of 1973, the Age Discrimination Act of 1975, and Section 13 of the Federal Water Pollution Control Act Amendments of 1972;
- Encouragement of participation of Service-Disabled Veteran-Owned Business Enterprises (“SDVOB”) in accordance with New York State Executive Law, Article 17-B and 9 NYCRR Part 252;
- American Iron and Steel (“AIS”) pursuant to P.L. 113-76, Consolidated Appropriates Act, 2014; WRRDA Section 608 of the Federal Water Pollution Control Act, as revised;
- Davis Bacon Related Acts (“DBRA”) consisting of the following: The Davis Bacon Act; Copeland Act (40 U.S.C. § 3145); Reorganization Plan No. 14; Department of Labor 29 CFR Parts 1, 3, and 5; Contract Work Hours and Safety Standards Act;
- Applicable State and/or local prevailing wage requirements;
- Requirements regarding suspension and debarment pursuant to 2 CFR Part 180, 2 CFR Part 1532, 29 CFR § 5.12, Executive Order 11246, State Labor Law § 220-b, and State Executive Law § 316; and,
- Restrictions on Lobbying pursuant to 40 CFR Part 34.

EFC or its authorized representatives, and other governmental entities as applicable, reserve the right to conduct occasional site inspections to monitor compliance with SRF program requirements.

This document is not intended to be inclusive of all applicable legal requirements and there may be other legal requirements that need to be included in a particular Contract or Subcontract that are not set forth here. Accordingly, EFC recommends that Recipients, Contractors, Subcontractors, and any other involved entities consult their legal counsel for advice on compliance with all applicable laws, including but not limited to local laws. This document is not intended to be legal advice.

Refer to the EFC website at www.efc.ny.gov for the latest version of the bid packet to ensure that the most recent forms and contract language are being used.

REQUIRED CONTRACT LANGUAGE

Part 2 of this document is the Required Contract Language. All of the language in Part 2 must be inserted into all Contracts and Subcontracts funded in whole or in part with SRF funds, in order for SRF Recipients, Contractors, and Subcontractors to comply with the above-listed SRF program requirements.

GUIDANCE MATERIALS

Part 3 of this document sets forth Guidance Materials intended to assist SRF Recipients, Contractors, and Subcontractors in complying with the foregoing SRF program requirements, as applicable.

The Guidance Materials are for informational purposes only and are not intended to be used as contractual language. Please do not incorporate the Guidance Materials into any Contracts or Subcontracts.

COMMONLY USED TERMS

The following commonly used terms are defined herein as follows:

“Contract” means an agreement between a Recipient and a Contractor.

“Contractor” means all bidders, prime contractors, Service Providers, and consultants as hereinafter defined, unless specifically referred to otherwise.

“Service Provider” means any individual or business enterprise that provides one or more of the following: legal, engineering, financial advisory, technical, or other professional services, supplies, commodities, equipment, materials, or travel.

“Subcontract” means an agreement between a Contractor and a Subcontractor.

“Subcontractor” means any individual or business enterprise that has an agreement, purchase order, or any other contractual arrangement with a Contractor.

“Recipient” means the party, other than EFC, to a grant agreement or a project finance agreement with EFC through which funds for the payment of amounts due thereunder are being paid in whole or in part.

“State” means the State of New York.

“Treatment Works” is defined in Clean Water Act (CWA) Section 212.

“Nonpoint Source Projects” and **“Green Infrastructure Projects”** are defined in CWA Section 319.

“Estuary Management Program Project” is defined in CWA Section 320.

PART 2: REQUIRED CONTRACT LANGUAGE

Recipient to Identify Contract Type:

☐ **Construction**

- ☐ **Treatment Works and Drinking Water Projects**
- ☐ **Non-Treatment Works**

☐ **Non-Construction**

SECTION 1 REQUIREMENTS AND PROCEDURES FOR BUSINESS PARTICIPATION OPPORTUNITIES FOR NEW YORK STATE CERTIFIED MINORITY- AND WOMEN-OWNED BUSINESS ENTERPRISES AND EQUAL EMPLOYMENT OPPORTUNITIES FOR MINORITY GROUP MEMBERS AND WOMEN

For purposes of this section:

“Non-Construction” shall mean Contracts for labor, services (including, but not limited to, legal, financial, and other professional services), supplies, equipment, materials, or any combination of the foregoing.

“Contracts Meeting Article 15-A Thresholds” shall mean Contracts or Subcontracts meeting the thresholds under New York State Executive Law Article 15-A as follows:

- (a) Non-Construction Contracts greater than \$25,000;
- (b) Non-Construction Contracts, that are initially under \$25,000 but subsequent change orders or contract amendments increase the Contract value to above \$25,000;
- (c) Construction Contracts greater than \$100,000; and,
- (d) Construction Contracts that are initially under \$100,000 but subsequent change orders or contract amendments increase the Contract value to above \$100,000.

The Equal Employment Opportunities requirements of this section apply to all Contracts and Subcontracts, with the exception of:

- (1) the requirements under Title VII of the Civil Rights Act of 1964 and 41 CFR Part 60-1 Subpart A which apply only to construction Contracts and Subcontracts;
- (2) the Federal Affirmative Action Regulations requirements which apply only to construction Contracts and Subcontracts greater than \$10,000.

The Minority- and Women- Owned Business Enterprises (“MWBE”) participation requirements of this section apply to the Contracts Meeting Article 15-A Thresholds.

Disregard this section if it does not apply to this Contract or Subcontract.

I. General Provisions

- A. Contractors and Subcontractors are required to comply with the following provisions:
1. New York State Executive Law Article 15-A and 5 NYCRR Parts 140-145 ("MWBE Regulations") for all State Contracts as defined therein, with a value (1) in excess of \$25,000 for labor, services (including, but not limited to, legal, financial, and other professional services), supplies, equipment, materials, or any combination of the foregoing, or (2) in excess of \$100,000 for the acquisition, construction, demolition, replacement, major repair or renovation of real property and improvements thereon.
 2. Title VI of the Civil Rights Act of 1964 and 40 CFR Part 7 ("Title VI") for any program or activity receiving federal financial assistance, as those terms are defined therein.
 3. Title VII of the Civil Rights Act of 1964 and 41 CFR Part 60-1 Subpart A ("Title VII") for construction Contracts related to any government programs providing federal financial assistance, as those terms are defined therein.
 4. 41 CFR Part 60-4 ("Federal Affirmative Action Regulations") for federal or federally assisted construction Contracts in excess of \$10,000, as those terms are defined therein.
 5. Section 504 of the Rehabilitation Act of 1973 ("Section 504") for any program or activity receiving federal financial assistance, as those terms are defined therein.
 6. The Age Discrimination Act of 1975 ("Age Discrimination Act") for any program or activity receiving federal financial assistance, as those terms are defined therein.
 7. Section 13 of the Federal Water Pollution Control Act ("Clean Water Act") Amendments of 1972 ("Section 13") for any program or activity receiving federal financial assistance under the Clean Water Act, as those terms are defined therein.
- B. Failure to comply with all of the requirements herein may result in a finding by the Recipient that the Contractor is non-responsive, non-responsible, and/or has breached the Contract, leading to the withholding of funds or such other actions, liquidated damages pursuant to subsection III(F) of this section, or enforcement proceedings as allowed by the Contract.
- C. If any terms or provisions herein conflict with Executive Law Article 15-A, the MWBE Regulations, Title VI, Title VII, or Federal Affirmative Action Regulations, such law and regulations shall supersede these requirements.
- D. Upon request from the Recipient's Minority Business Officer ("MBO") and/or EFC, Contractor will provide complete responses to inquiries and all MWBE and EEO records available within a reasonable time. For purposes of this section, MBO means the duly authorized representative of the SRF Recipient for MWBE and EEO purposes.

II. Equal Employment Opportunities (EEO)

Applicable to all Contracts and Subcontracts unless otherwise noted

- A. Each Contractor and Subcontractor performing work on the Contract shall undertake or continue existing EEO programs to ensure that minority group members and women are afforded equal employment opportunities without discrimination because of race, creed, color, national origin, sex, age, disability or marital status. For these purposes, EEO shall apply in the areas of recruitment, employment, job assignment, promotion, upgrading, demotion, transfer, layoff, or termination and rates of pay or other forms of compensation.
- B. The Contractor shall comply with the provisions of the Human Rights Law (Executive Law Article 15), Title VI, Title VII, the Federal Affirmative Action Regulations, Section 504, Age Discrimination Act, Section 13, and all other State and Federal statutory and constitutional non-discrimination provisions. The Contractor and Subcontractors shall not discriminate against any employee or applicant for employment because of race, creed (religion), color, sex, national origin, sexual orientation, military status, age, disability, predisposing genetic characteristic, marital status or domestic violence victim status, and shall also follow the requirements of the Human Rights Law with regard to non-discrimination on the basis of prior criminal conviction and prior arrest.

- C. Contractors and Subcontractors shall have instituted grievance procedures to assure the prompt and fair resolution of complaints when a violation of Title VI of the Civil Rights Act of 1964 or Title 40 CFR Part 7 is alleged.
- D. Pursuant to 40 CFR § 7.95, the Contractor shall display a copy of the EEO notice at the project site in a visible location. The notice shall accommodate individuals with impaired vision or hearing and should be provided in languages other than English where appropriate. The notice must also identify the employee responsible for its EEO compliance. A copy of the EEO notice ("EEO Poster") can be found at:
<https://www.dol.gov/ofccp/regs/compliance/posters/pdf/eeopost.pdf> .

The Contractor will include the provisions of Subdivisions II(A) and II(C) in every Subcontract in such a manner that the requirements of these subdivisions will be binding upon each Subcontractor as to work in connection with the Contract.

Applicable to all construction Contracts

- E. The Contractor and Subcontractor will comply with the requirements of 41 CFR § 60-1.4(b) and (c), and such provisions are hereby incorporated by reference. These provisions require, in part, that the Contractor and Subcontractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The Contractor and Subcontractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.

Applicable to construction Contracts greater than \$10,000

- F. The Contractor and Subcontractor will comply with the Affirmative Action Regulations and such provisions are hereby incorporated by reference. These provisions require, in part, that the Contractor and Subcontractor place affirmative action goals on Contracts and Subcontracts, as established by the United States Department of Labor. Affirmative action goals for minorities and women by geographic region can be found here:
<https://www.dol.gov/sites/dolgov/files/ofccp/ParticipationGoals.pdf> .

G. Required EEO Forms

Pursuant to 41 CFR Section 60-1.7 for federally assisted construction Contracts, Contractor and Subcontractor will annually file an EEO-1 Report with the Joint Reporting Committee for the Office of Federal Contract Compliance Programs (OFCCP) and the Equal Employment Opportunity Commission (EEOC) according to the instructions provided at
<https://www.eeoc.gov/employers/eo-1-survey/eo-1-instruction-booklet> , if Contractor or Subcontractor:

1. Is not exempt from compliance pursuant to 41 CFR § 60-1.5;
2. Has 50 or more employees;
3. Is a prime Contractor or first tier Subcontractor; or Subcontractor below the first tier which performs construction work at the site of construction; and
4. Has a Contract, Subcontract, or purchase order amounting to \$50,000 or more.

III. Business Participation Opportunities for MWBEs

Applicable to Contracts Meeting Article 15-A Thresholds

A. Contract Goals

1. For purposes of this Contract, EFC establishes the following goals for New York State certified MWBE participation based on the current availability of qualified MBEs and WBEs.

Program	MWBE Contract Goal*
CWSRF, DWSRF, & Green Innovation Grant Program	20%
NYS Water Infrastructure Improvement Act Grants (also receiving EFC loan)	Clean Water project 23% Drinking Water project 26%
NYS Intermunicipal Grants (also receiving EFC loan)	Clean Water project 24% Drinking Water project 24%

*May be any combination of MBE and/or WBE participation

2. For purposes of providing meaningful participation by MWBEs on the Contract and achieving the MWBE Contract Goals established in Section III-A hereof, the Contractor should reference the directory of New York State Certified MWBEs found at the following internet address: <https://ny.newnycontracts.com>.
3. The Contractor understands that only sums paid to MWBEs for the performance of a commercially useful function, as that term is defined in 5 NYCRR § 140.1, may be applied towards achievement of applicable MWBE participation goals.
 - a. For construction and construction-related services Contracts or Subcontracts, the portion of the Contract or Subcontract with an MWBE serving as a supplier, and so designated in ESD's Directory, that shall be deemed to represent the commercially useful function performed by the MWBE shall be 60% of the total value of the Contract or Subcontract. The portion of a Contract or Subcontract with an MWBE serving as a broker, as denoted by NAICS code 425120, that shall be deemed to represent the commercially useful function performed by the MWBE shall be the monetary value for fees, or the markup percentage, charged by the MWBE.
 - b. For non-construction Contracts or Subcontracts, the portion of a Contract or Subcontract with an MWBE serving as a broker that shall be deemed to represent the commercially useful function performed by the MWBE shall be 25% of the total value of the contract
4. Where MWBE Contract Goals have been established herein, pursuant to 5 NYCRR § 142.8, the Contractor must document "good faith efforts" to provide meaningful participation by MWBEs as Subcontractors or suppliers in the performance of the Contract.
5. In accordance with Section 316-a of Article 15-A and 5 NYCRR § 142.13, the Contractor acknowledges that if it is found to have willfully and intentionally failed to comply with the MWBE participation goals set forth in the Contract, such a finding constitutes a breach of Contract and the Contractor shall be liable to the Recipient for liquidated or other appropriate damages, as set forth herein.

B. MWBE Utilization Plan

1. The Contractor represents and warrants that Contractor has submitted an MWBE Utilization Plan to the Recipient prior to the execution of this Contract.
2. The Contractor agrees to use such MWBE Utilization Plan for the performance of MWBEs on the Contract pursuant to the prescribed MWBE goals set forth in Section III-A of this section.

3. The Contractor further agrees that a failure to submit and/or use such MWBE Utilization Plan shall constitute a material breach of the terms of the Contract. Upon the occurrence of such a material breach, the Recipient shall be entitled to any remedy provided herein, including but not limited to, a finding that the Contractor is not responsive.
4. Contractor must report any changes to the Utilization Plan after Contract award and during the term of the Contract to the Recipient's MBO. Contractor shall indicate the changes to the MBO in the next Monthly MWBE Contractor Compliance Report after the changes occurred. At EFC's discretion, an updated MWBE Utilization Plan form and good faith effort documentation may be required to be submitted. When a Utilization Plan is revised due to execution of a change order, the change order should be submitted to the MBO with the Monthly MWBE Contractor Compliance Report or revised Utilization Plan.
5. The Contractor shall submit copies of all fully executed Subcontracts, agreements, and purchase orders that are referred to in the MWBE Utilization Plan to the MBO within 30 days of their execution.

C. Requests for Waiver

1. If the Contractor, after making good faith efforts, is unable to comply with MWBE goals, the Contractor may submit a Request for Waiver to the Recipient documenting good faith efforts by the Contractor to meet such goals. If the documentation included with the waiver request is complete, the Recipient shall forward the request to EFC for evaluation, and EFC will issue a written notice of acceptance or denial within twenty (20) days of receipt.
2. If the Recipient, upon review of the MWBE Utilization Plan and updated Quarterly MWBE Contractor Compliance Reports determines that the Contractor is failing or refusing to comply with the MWBE Contract Goals and no waiver has been issued in regards to such non-compliance, the Recipient may issue a notice of deficiency to the Contractor. The Contractor must respond to the notice of deficiency within seven (7) business days of receipt. Such response may include a request for partial or total waiver of MWBE Contract Goals.

D. Monthly MWBE Contractor Compliance Report ("Monthly MWBE Report")

The Contractor agrees to submit a report to the Recipient by the third business day following the end of each month over the term of this Contract documenting the payments made and the progress towards achievement of the MWBE goals of the Contract. The Monthly MWBE Report must be supplemented with proof of payment by the Contractor to its Subcontractors (e.g., copies of both sides of a cancelled check) and proof that Subcontractors have been paid within 30 days of receipt of payment from the Recipient. The final Monthly MWBE Report must reflect all Utilization Plan revisions and change orders.

E. Liquidated Damages - MWBE Participation

In accordance with Section 316-a of Article 15-A and 5 NYCRR §142.13, if it has been determined by the Recipient or EFC that the Contractor has willfully and intentionally failed to comply with the MWBE participation goals, the Contractor shall be obligated to pay to Recipient liquidated damages or other appropriate damages, as specified herein and as determined by the Recipient or EFC.

Liquidated damages shall be calculated as an amount not to exceed the difference between:

1. All sums identified for payment to MWBEs had the Contractor achieved the approved MWBE participation goals; and,
2. All sums actually paid to MWBEs for work performed or materials supplied under this Contract.

The Recipient and EFC reserve the right to impose a lesser amount of liquidated damages than the amount calculated above based on the circumstances surrounding the Contractor's non-compliance.

In the event a determination has been made by the Recipient or EFC which requires the payment of damages identified herein and such identified sums have not been withheld, Contractor shall pay such damages to the Recipient within sixty (60) days after they are assessed unless prior to the expiration of such sixtieth day, the Contractor has filed a complaint with the Empire State Development Corporation – Division of Minority and Women’s Business Development (“ESD”) pursuant to Subdivision 8 of Section 313 of the Executive Law in which event the damages shall be payable if the Director of ESD renders a decision in favor of the Recipient.

SECTION 2 PARTICIPATION OPPORTUNITIES FOR NEW YORK STATE CERTIFIED SERVICE-DISABLED VETERAN-OWNED BUSINESSES

New York State Executive Law Article 17-B and 9 NYCRR Part 252 provide for more meaningful participation in public procurement by certified Service-Disabled Veteran-Owned Businesses (“SDVOBs”), thereby further integrating such businesses into New York State’s economy. EFC recognizes the need to promote the employment of service-disabled veterans and to ensure that certified service-disabled veteran-owned businesses have opportunities for maximum feasible participation in the performance of EFC Contracts.

In recognition of the service and sacrifices made by service-disabled veterans and in recognition of their economic activity in doing business in New York State, Contractors are strongly encouraged and expected to consider SDVOBs in the fulfillment of the requirements of the Contract. Such participation may be as Subcontractors or suppliers, as protégés, or in other partnering or supporting roles.

Contractor is encouraged to make good faith efforts to promote and assist in the participation of SDVOBs on the Contract for the provision of services and materials. The directory of New York State Certified SDVOBs can be viewed at: <http://ogs.ny.gov/Core/SDVOBA.asp>.

Contractor is encouraged to contact the Office of General Services’ Division of Service-Disabled Veteran’s Business Development at 518-474-2015 or VeteransDevelopment@ogs.ny.gov to discuss methods of maximizing participation by SDVOBs on the Contract.

SECTION 3 AMERICAN IRON AND STEEL (AIS) REQUIREMENT

The requirements of this section apply to (1) all construction Contracts and Subcontracts for DWSRF projects and CWSRF treatment works projects and (2) all Contracts for the purchase of iron and steel products for a DWSRF project or CWSRF treatment works project. Disregard this section if it does not apply to this Contract or Subcontract.

The Contractor acknowledges to and for the benefit of the Recipient of the Clean Water State Revolving Fund (“CWSRF”) or the Drinking Water State Revolving Fund (“DWSRF”) financial assistance that the Contractor understands the goods and services under this Agreement are being funded with monies made available by the New York State Environmental Facilities Corporation (“EFC”) through the CWSRF or the DWSRF and that such funding is subject to certain statutory restrictions requiring that certain iron and steel products used in the project be produced in the United States (“American Iron and Steel Requirement”) including iron and steel products provided by the Contractor pursuant to this Agreement.

The Contractor hereby represents and warrants that:

- (a) the Contractor has reviewed and understands the American Iron and Steel Requirement,
- (b) all of the iron and steel products covered by the American Iron and Steel Requirement used in the project will be and/or have been produced in the United States in a manner that complies with the American Iron and Steel Requirement, unless a waiver of the requirement is approved, and
- (c) the Contractor will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the American Iron and Steel Requirement, as may be requested by the Recipient.

Notwithstanding any other provision of this Agreement, any failure to comply with this paragraph by the Contractor shall permit the Recipient to recover as damages against the Contractor any loss, expense, or cost (including without limitation attorney's fees) incurred by the Recipient resulting from any such failure (including without limitation any impairment or loss of funding, whether in whole or in part, from the EFC or any damages owed to the EFC by the Recipient). While the Contractor has no direct contractual privity with the EFC, as a lender to the Recipient for the funding of this project, the Recipient and the Contractor agree that the EFC is a third-party beneficiary and neither this paragraph, nor any other provision of this Agreement necessary to give this paragraph force or effect, shall be amended or waived without the prior written consent of the EFC.

SECTION 4 DAVIS-BACON (DB) PREVAILING WAGE REQUIREMENTS

The requirements of this section apply to all construction Contracts and Subcontracts greater than \$2,000 for either DWSRF projects or CWSRF treatment works projects. Disregard this section if it does not apply to this Contract or Subcontract.

For Contracts in Excess of \$2,000:

1. Minimum Wages

(i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR § 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein provided that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its Subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers. The Davis-Bacon poster (WH-1321) can be found at <https://www.dol.gov/whd/regs/compliance/posters/davis.htm> . Wage determinations may be obtained from the US Department of Labor's website, <http://www.beta.sam.gov> .

(ii)(A) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the Contract shall be classified in conformance with the wage determination. The contracting officer shall approve a request for an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

1. The work to be performed by the classification requested is not performed by a classification in the wage determination;
2. The classification is utilized in the area by the construction industry; and,
3. The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), documentation of the action taken and the request, including the local wage determination shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210 and to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification request within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(C) In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the request and the local wage determination, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The request shall be sent to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt of the request and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (1) (ii)(B) or (C) of this section, shall be paid to all workers performing work in the classification under this Contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the Contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program *provided* that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding. The Recipient shall upon its own action or upon written request of the EPA Award Official or an authorized representative of the Department of Labor withhold or cause to be withheld from the Contractor under this Contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any Subcontractor the full amount of wages required by the Contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the Contract, the Recipient may, after written notice to the Contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records.

(i) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR § 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B)

of the Davis–Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The Contractor shall submit weekly for each week in which any Contract work is performed a copy of all payrolls to the Recipient. Such documentation shall be available on request of EFC or EPA. As to each payroll copy received, the Recipient shall provide written confirmation in a form satisfactory to EFC indicating whether or not the project is in compliance with the requirements of 29 CFR § 5.5(a)(1) based on the most recent payroll copies for the specified week. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR § 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available for this purpose from the Wage and Hour Division Web site at <https://www.dol.gov/agencies/whd/government-contracts/construction/forms> or its successor site. The prime Contractor is responsible for the submission of copies of payrolls by all Subcontractors. Contractors and Subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the Recipient, for transmission to EFC, EPA if requested by EPA, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime Contractor to require a Subcontractor to provide addresses and social security numbers to the prime Contractor for its own records, without weekly submission to the Recipient (or the applicant, sponsor, or owner).

(B) Each payroll submitted shall be accompanied by a “Statement of Compliance,” signed by the Contractor or Subcontractor or his or her agent who pays or supervises the payment of the persons employed under the Contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under 29 CFR § 5.5(a)(3)(ii), the appropriate information is being maintained under 29 CFR § 5.5(a)(3)(i), and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the Contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the Contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH–347 shall satisfy the requirement for submission of the “Statement of Compliance” required by paragraph (3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the Contractor or Subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The Contractor or Subcontractor shall make the records required under paragraph (3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the Recipient, EFC, EPA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the Contractor or Subcontractor fails to submit the

required records or to make them available, the Recipient, EFC, or EPA may, after written notice to the Contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR § 5.12.

4. Apprentices and trainees.

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a Contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or Subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR § 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

5. Compliance with Copeland Act Requirements. The Contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this Contract.

6. Subcontracts. The Contractor or Subcontractor shall insert in any Subcontracts the clauses contained in 29 CFR § 5.5(a)(1) through (10) and such other clauses as the Recipient may by appropriate instructions require, and also a clause requiring the Subcontractors to include these clauses in any lower tier Subcontracts. The prime Contractor shall be responsible for the compliance by any Subcontractor or lower tier subcontractor with all the Contract clauses in 29 CFR § 5.5.

7. Contract Termination: Debarment. A breach of the contract clauses in 29 CFR § 5.5 may be grounds for termination of the Contract, and for debarment as a Contractor and a Subcontractor as provided in 29 CFR § 5.12.

8. Compliance with Davis–Bacon and Related Act requirements. All rulings and interpretations of the Davis–Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this Contract.

9. Disputes Concerning Labor Standards. Disputes arising out of the labor standards provisions of this Contract shall not be subject to the general disputes clause of this Contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its Subcontractors) and the Recipient, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

(i) By entering into this Contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government Contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this Contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. § 1001.

For Contracts in Excess of \$100,000:

1. Overtime requirements. No Contractor or Subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1) of this section the Contractor and any Subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such Contractor and Subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1) of this section, in the sum of \$25 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1) of this section.

3. Withholding for unpaid wages and liquidated damages. The Recipient shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any monies payable on account of work performed by the Contractor or Subcontractor under any such Contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or Subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2) of this section.

4. Subcontracts. The Contractor or Subcontractor shall insert in any Subcontracts the clauses set forth in paragraphs (1) through (4) of this section and also a clause requiring the Subcontractors to include these clauses in any lower tier Subcontracts. The prime Contractor shall be responsible for compliance by any Subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1) through (4) of this section.

5. In any Contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR § 5.1, the Contractor or Subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the Contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the records to be maintained under this paragraph shall be made available by the Contractor or Subcontractor for inspection, copying, or transcription by authorized representatives of the Recipient and the Department of Labor, and the Contractor or Subcontractor will permit such representatives to interview employees during working hours on the job.

SECTION 5 REQUIREMENTS REGARDING SUSPENSION AND DEBARMENT

The requirements of this section apply to all Contracts and Subcontracts.

Contractor and any Subcontractors shall comply with, Subpart C of 2 CFR Part 180 as implemented and supplemented by 2 CFR Part 1532. The Contractor is not a debarred or suspended party under 2 CFR Part 180 or 2 CFR Part 1532, or 29 CFR § 5.12. Neither the Contractor nor any of its Subcontractors have contracted with, or will contract with, any debarred or suspended party under the foregoing regulations.

The Contractor and any Subcontractor have not been debarred from or deemed ineligible for Government Contracts or federally assisted construction Contracts pursuant to Executive Order 11246.

The Contractor and any Subcontractors have not been deemed ineligible to submit a bid on or be awarded a public contract or subcontract pursuant to Article 8 of the State Labor Law, specifically Labor Law § 220-b. In addition, neither the Contractor nor any Subcontractors have contracted with, or will contract with, any party that has been deemed ineligible to submit a bid on or be awarded a public contract or subcontract under Labor Law § 220-b.

In addition, the Contractor and any Subcontractors have not been deemed ineligible to submit a bid and have not contracted with and will not contract with any party that has been deemed ineligible to submit a bid under Executive Law § 316.

SECTION 6 RESTRICTIONS ON LOBBYING

The requirements of this section apply to all Contracts and Subcontracts greater than \$100,000. Disregard this section if it does not apply to this Contract or Subcontract.

The Contractor and any Subcontractor executing a Contract or Subcontract in excess of \$100,000 agree to provide to the Recipient an executed Certification Regarding Lobbying pursuant to 40 CFR Part 34 ("Lobbying Certification") in the form attached hereto as Attachment 9, consistent with the prescribed form provided in Appendix A to 40 CFR Part 34.

PART 3: GUIDANCE MATERIALS

APPLICABILITY OF PROGRAM REQUIREMENTS

This table contains a breakdown of the applicable program requirements based on contract type and its value. For further details pertaining to each requirement, refer to the section identified in the heading. The relevant section number is the same in both Part 2 and Part 3 of this document.

Type of Contract	MWBE Section 1	EEO¹ Section 1	Title VII Section 1	AIS Section 3	Davis Bacon Section 4	FAAR² Section 1	Suspension & Debarment Section 6	Restrictions on Lobbying Section 7
Construction: Treatment Works & Drinking Water Projects								
All		X	X	X			X	
If greater than:								
\$2,000		X	X	X	X		X	
\$10,000		X	X	X	X	X	X	
\$100,000	X	X	X	X	X	X	X	X
Construction: Non-Treatment Works								
All		X	X				X	
If greater than:								
\$10,000		X	X			X	X	
\$100,000	X	X	X			X	X	X
Non-Construction								
All		X		X				
If greater than:								
\$25,000	X	X		X				
\$100,000	X	X		X				X

¹ For purposes of this table, "EEO" includes the following: EEO requirements under 40 CFR Part 33, Title VI, Section 504, Age Discrimination Act, and Section 13.

² For purposes of this table, "FAAR" means the Federal Affirmative Action Regulations.

SECTION 1 GUIDANCE FOR THE REQUIREMENTS AND PROCEDURES FOR BUSINESS PARTICIPATION OPPORTUNITIES FOR FEDERAL DISADVANTAGED BUSINESS ENTERPRISES AND NEW YORK STATE CERTIFIED MINORITY- AND WOMEN-OWNED BUSINESS ENTERPRISES AND EQUAL EMPLOYMENT OPPORTUNITIES FOR MINORITY GROUP MEMBERS AND WOMEN

I. Summary of EEO and MWBE forms

A. Forms to be Submitted Prior to Contract Execution

Applicable to Contracts Meeting Article 15-A Thresholds

1. **MWBE Utilization Plan**

To be submitted by the Contractor to the MBO after the bid opening, but in no case more than ten (10) business days after the Contractor receives notice from the Recipient that the Contractor has submitted a low bid. For Contracts that are not bid, it is to be submitted prior to the Contract execution date. This form is attached hereto as Attachment 4. See Required Contract Language, Section 1(III)(B).

B. Forms to be Submitted During the Term of the Contract

Applicable to Contracts Meeting Article 15-A Thresholds

1. **Request for Partial or Total MWBE Waiver**

If applicable, to be submitted by the Contractor to the MBO at any time during the term of the Contract, but prior to the submission of a request for final payment on the Contract. This form is attached hereto as Attachment 5. See Required Contract Language, Section 1(III)(C).

2. **Monthly MWBE Contractor Compliance Report ("Monthly MWBE Report")**

To be submitted by the Contractor to the MBO by the third business day following the end of each month over the term of the Contract. This form is attached hereto as Attachment 3. See Required Contract Language, Section 1(III)(D).

Applicable to all construction Contracts

3. **EEO-1 Report**

To be submitted by the Contractor and Subcontractor, as applicable, annually during the term of the Contract or Subcontract. A sample EEO-1 Report can be found here:

https://www.eeoc.gov/sites/default/files/migrated_files/employers/eeo1survey/eeo1-2-2.pdf

Instructions for how to submit the EEO-1 Report online can be found here:

<https://www.eeoc.gov/employers/eeo-1-survey/eeo-1-instruction-booklet> . See Section 1(II)(D), Required Contract Language.

II. Equal Employment Opportunities (EEO)

A. EEO Poster

Applicable to all construction Contracts

Attachment 1, *EEO Poster*, is the notice provided by the United States Department of Labor, with a place added to identify the employee responsible for EEO compliance, as required by 40 CFR § 7.95.

B. EEO Goals

Applicable to construction Contracts greater than \$10,000

Pursuant to 41 CFR Part 60-4, the United States Department of Labor has established EEO goals for the employment of minorities and women. For federal and federally assisted construction Contractors, goals for minorities and females are established as a percentage participation rate. These goals are applicable to all of a Contractor's construction work sites (whether or not these sites are also the result of a federal Contract or are federally assisted). The goals are applicable

to each nonexempt Contractor's total onsite construction workforce, regardless of whether or not part of that workforce is performing work on a federal, federally assisted or non-federally related project Contract or Subcontract. Contractors should apply to each work site the goal for the geographical area that each particular work site is located in. These goals, and further information, are available at: <https://www.dol.gov/sites/dolgov/files/ofccp/ParticipationGoals.pdf>.

III. Business Participation Opportunities for MWBEs

Applicable to Contracts Meeting Article 15-A Thresholds

A. Contract Goals

The goals provided herein (Required Contract Language, Section 1(III)(A)) are effective as of October 1, 2020. MWBE participation goals for a contract will be based on the goals in place at the time of the execution date of each respective contract, unless otherwise specified.

Please contact EFC if you have any questions about the applicable MWBE participation goals for your contract.

B. Good Faith Efforts

The Contractor must make good faith efforts to develop an adequate MWBE Utilization Plan and must continue such good faith efforts to meet applicable MWBE participation goals. The Contractor shall maintain documentation of good faith efforts to solicit participation of MWBE firms for SRF-funded projects. If a Contractor is unable to meet contract MWBE participation goals, and submits a Request for Waiver, documentation of such good faith efforts must accompany the request. See Required Contract Language, Section 1(III)(C).

Contractor should also continue good faith efforts to seek opportunities for MWBE participation during the life of the contract even if proposed goals have been achieved.

Examples of documentation of good faith efforts are set forth below:

- Information on the scope of work related to the contract, such as a copy of the schedule of values from the bid submission, and specific steps taken to reasonably structure the scope of work to break out tasks or equipment needs for the purpose of providing opportunities for subcontracting with, or obtaining supplies or services from, MBEs or WBEs.
- Printed screenshots of the directory of Certified Minority- and Women- Owned Business Enterprises ("MWBE directory") on ESD's website for certified MWBEs that provide the services or equipment necessary for the contract. Contact the MBO for assistance in performing a proper search including identifying a sufficient number of solicitations to show that good faith effort was made.
- Copies of timely solicitations and documentation (e.g., faxes and emails) that the Contractor offered relevant plans, specifications, or other related materials to MBE and WBE firms on ESD's MWBE directory to participate in the work, with the responses.
- A log prepared by the Contractor in a sortable spreadsheet documenting the Contractor's solicitation of MBEs and WBEs for participation as Subcontractors or suppliers pursuant to a contract. The log should consist of the list of MBE and WBE firms solicited, their contact information, the type of work they were solicited to perform (or equipment to provide), how the solicitation was made (fax, phone, email) and the contact information, the contacts name and the outcome. If a bid was received, the bid price should also be included in the log. See a sample log format below:

Date	M/WBE Type	Company	Scope of work	Contact Name	Phone/ Email	Solicitation Format	MWBE Response	Negotiation Required?	Selected? If not, Explain

If no response was received to an initial solicitation, at least one follow-up solicitation should be made in a different format than the first, e.g. fax followed by phone call. Any winning bids received from non-MWBE firms for the same areas MWBEs were solicited should also be tracked on the log.

- Copies of any advertisements of sufficient duration to effectively seek participation of certified MBE and WBEs timely published in appropriate general circulation, trade and MWBE oriented publications, together with listing and dates of publication of such advertisements. EFC recommends the use of the NYS Contract Reporter that is free to all Contractors - <https://www.nyscr.ny.gov> .
- Documents demonstrating that insufficient MBEs or WBEs are reasonably available to perform the work.
- A written demonstration that the Contractor offered to make up any inability to meet the project MWBE participation goals in other Contracts and/or agreements performed by the Contractor on another SRF funded project.
- The date of pre-bid, pre-award, or other meetings scheduled by the Recipient, if any, and the contact information of any MBEs and WBEs who attended and are capable of performing work on the project.
- Any other information or documentation that demonstrates the Contractor conducted good faith efforts to provide opportunities for MWBE participation in their work. For instance, Prime Contractors and MBOs should develop a list of MWBE firms that have expressed interest in working on SRF-funded projects.

EFC reserves the right to request additional information and/or documentation to support the adequacy of the MWBE Utilization Plan and/or waiver request.

C. Review of the MWBE Utilization Plan

The MBO will evaluate a completed MWBE Utilization Plan. If the MBO finds the Utilization Plan sufficient, it will be forwarded to EFC for review. If the MBO finds the Utilization Plan insufficient, the MBO will work with the Contractor to address deficiencies before submitting to EFC for review. A written notice of acceptance or deficiency will be issued by EFC within 20 business days of receipt of the Utilization Plan. Upon receipt of a notice of deficiency from either the MBO or EFC, the Contractor shall respond with a written remedy to such notice within seven (7) business days of receipt.

D. Eligibility for MWBE Participation Credit

1. To receive MWBE participation credit, Contractors or Subcontractors performing work that have been identified in an approved MWBE Utilization Plan must be certified as an MBE or WBE by ESD.
 - a. A Contractor, who is a certified MBE or WBE, will be credited for up to 100% of the category of their certification. However, good faith efforts to seek participation in the other category are also required.
2. Prime Contractors may also include second or lower tier Subcontractors (Subcontractors hired by Subcontractors) on their MWBE Utilization Plan.
3. Credit for MWBE participation shall be granted only for MWBE firms performing a commercially useful business function according to custom and practice in the industry. An MWBE does not perform a commercially useful function if its role adds no substantive value and is limited to that of an extra participant in a transaction, contract, or project through which funds are passed in order to obtain the appearance of participation.
 - a. "Commercially useful functions" normally include:

- i. Providing technical assistance to a purchaser prior to a purchase, during installation, and after the supplies or equipment are placed in service;
 - ii. Manufacturing or being the first tier below the manufacturer of supplies or equipment;
 - iii. Providing functions other than merely accepting and referring requests for supplies or equipment to another party for direct shipment to a Contractor; or,
 - iv. Being responsible for ordering, negotiating price, and determining quality and quantity of materials and supplies.
- b. For construction Contracts or Subcontracts, the following rules apply when calculating MWBE utilization:
 - i. The portion of a Contract or Subcontract with an MWBE serving as a manufacturer that shall be deemed to represent the commercially useful function performed by the MWBE shall be 100% of the total value of the Contract or Subcontract.
 - ii. the portion of a Contract or Subcontract with an MWBE serving as a supplier (as denoted by a NAICS code beginning with 423 or 424, or a NIGP code that does not begin with the number 9), and so designated in ESD's Directory, that shall be deemed to represent the commercially useful function performed by the MWBE shall be 60% of the total value of the Contract or Subcontract.
 - iii. the portion of a Contract or Subcontract with an MWBE serving as a broker (as denoted by NAICS code 425120) that shall be deemed to represent the commercially useful function performed by the MWBE shall be the monetary value for fees, or the markup percentage, charged by the MWBE.
- c. For non-construction Contracts or Subcontracts, the following rules apply when calculating MWBE utilization:
 - i. the portion of a Contract or Subcontract with an MWBE serving as a broker that shall be deemed to represent the commercially useful function performed by the MWBE shall be 25% of the total value of the contract. Any firms that are listed as brokers or manufacturers' representatives (NAICS code 425120) and not specifically as suppliers fall in this category.
- d. No credit will be granted for MWBEs that do not perform a commercially useful function.

E. Requests for Waiver

1. If the Contractor's application of good faith efforts does not result in the utilization of MWBE firms to achieve the aforementioned goals or a specialty equipment/service waiver is requested, the Contractor may request a full or partial waiver of MWBE participation goals by completing a Request for Waiver form, attaching appropriate documentation of good faith efforts, and submitting same to the MBO. See also Required Contract Language, Section 1(III)(C). Even if an MWBE waiver is granted, EEO information must still be submitted.
2. The MBO and EFC will review each waiver request based on the good faith effort criteria presented above and the documentation submitted with the waiver request. EFC will not issue any automatic waivers from MWBE responsibilities.
3. Specialty Equipment/Service Exclusion: A specialty equipment/service exclusion may be granted in cases where:
 - a. equipment is made by only one non-MWBE manufacturer,
 - b. the technical specifications call for equipment that is not available through an MWBE supplier;
 - c. the equipment is constructed on site by specially trained non-MWBE labor;
 - d. the service is not available through an MWBE (such as work done by National Grid);
 - e. the service is proprietary in nature (such as use of certain computer software necessary for control systems); or,

- f. the service cannot be subcontracted (such as litigation services).

If the contract includes specialty equipment or services, and documentation is submitted demonstrating that there are no MWBE firms capable of completing this portion of the contract, the specialty amount of the contract may be deducted from the total contract amount to determine the MWBE Eligible Amount and the goals will be applied to the MWBE Eligible Amount. This determination is made at the discretion of the MBO and EFC.

Example:

$$\begin{array}{rcl} \$200,000 & - & \$50,000 \\ \text{(Contract)} & \text{(Specialty equipment/service)} & \\ \hline & & = \$150,000 \\ & & \text{(MWBE Eligible Amount)} \end{array}$$

The MWBE goal is applied to the MWBE Eligible Amount.

A request for this specialty equipment/service deduction can be completed by filling out a Request for Waiver form and submitting it to the MBO. The request must include a copy of the page from the contract where the equipment/ service is described, an ESD search result for the manufacturer or manufacturer's representative, and documentation of the cost of each item. For construction Contracts, the schedule of values or bid tabulation sheet should also be submitted. Additional documentation may be requested by the MBO or EFC.

IV. Subcontractor's Responsibilities

Subcontractors should:

1. Maintain their MWBE certifications and notify the Contractor and MBO of any change in their certification status.
2. Notify the Contractor of any MWBE Subcontractors they hire so they may be included on the Contractor's Utilization Plan.
3. Respond promptly to solicitation requests by completing and submitting bid information in a timely manner.
4. Maintain business records that should include, but not be limited to, Contracts/agreements, records of receipts, correspondence, purchase orders, and canceled checks.
5. Ensure that a required EEO Policy Statement and applicable MWBE requirements are included in each subcontract.
6. Notify the MBO and EFC when contract problems arise, such as non-payment for services or when the Subcontractor is not employed as described in the MWBE Utilization Plan.

V. Protests/Complaints

Contractors or Subcontractors who have any concerns, issues, or complaints regarding the implementation of the SRF MWBE & EEO Program or wish to protest should do so in writing to the MBO and EFC. The MBO, in consultation with EFC, will review the circumstances described in the submission, investigate to develop additional information, if warranted, and determine whether action is required. If the Contractor or Subcontractor believes the issue has not been resolved to their satisfaction, they may appeal in writing to EFC for consideration.

VI. Waste, Fraud and Abuse

Subcontractors, Contractors, or Recipients who know of or suspect any instances of waste, fraud, or abuse within the MWBE & EEO Program should notify the project MBO and EFC immediately. Additionally, suspected fraud activity should be reported to the USEPA – Office of Inspector General Hotline at (888) 546-8740, the New York State Office of Inspector General at (800) 367-4448, or the ESD Compliance Office at (212) 803-3266.

SECTION 2 GUIDANCE FOR NEW YORK STATE CERTIFIED SERVICE-DISABLED VETERAN-OWNED BUSINESS ENTERPRISES (“SDVOB”) PARTICIPATION OPPORTUNITIES

Contractor may contact the Office of General Services’ Division of Service-Disabled Veteran’s Business Development at 518-474-2015 or VeteransDevelopment@ogs.ny.gov to discuss methods of maximizing participation by SDVOBs on the Contract. The directory of New York State Certified SDVOBs can be viewed at: <http://ogs.ny.gov/Core/SDVOBA.asp> .

Please contact EFC if you have any questions about utilizing SDVOBs on the Contract.

SECTION 3 GUIDANCE FOR AMERICAN IRON AND STEEL (“AIS”) REQUIREMENT

Since 2014, if a Recipient uses CWSRF or DWSRF financial assistance to fund all or a part of the construction, alteration, maintenance or repair a public water system or treatment works, the Recipient must use iron and steel products that are produced in the United States for the whole project.

The AIS requirement does not apply to:

1. a project for which engineering plans and specifications were submitted for review by the responsible State agency before January 17, 2014 and approved by that agency before April 15, 2014; or
2. a project funded by a financial assistance agreement with EFC that was signed before January 17, 2014.

The term “iron and steel products” means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, construction materials. For one of the listed products to be considered subject to the AIS requirement, it must be made of greater than 50% iron and steel, measured by material cost (with the exception of reinforced precast concrete products).

The term “produced in the United States” means that all manufacturing processes of the iron or steel, including application of coatings, take place in the United States, with the exception of metallurgical processes involving refinement of steel additives. All manufacturing processes includes processes such as melting, refining, forming, rolling, drawing, finishing, fabricating and coating. Further, if a domestic iron and steel product is taken out of the US for any part of the manufacturing process, it becomes foreign source material. However, raw materials such as iron ore, limestone and iron and steel scrap are not covered by the AIS requirement and the material(s), if any, being applied as a coating are similarly not covered. Non-iron or steel components of an iron and steel product may come from non-US sources. For example, for products such as valves and hydrants, the individual non-iron and steel components do not have to be of domestic origin.

The EPA may waive the AIS requirement for a treatment works project if:

1. applying the requirement would be inconsistent with the public interest;
2. iron and steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or
3. inclusion of iron and steel products produced in the United States will increase the cost of the overall project by more than 25 percent.

A request for a waiver to use foreign iron or steel products must include adequate information for EPA’s evaluation of the request, including:

1. A description of the foreign and domestic iron, steel, and/or manufactured goods;
2. Unit of measure;
3. Quantity;

4. Cost;
5. Time of delivery or availability;
6. Location of the project;
7. Name and address of the proposed supplier; and,
8. A detailed justification for use of foreign iron or steel products.

Requests for AIS waivers are to be submitted to EFC. Upon review, EFC will submit AIS waiver requests to EPA. When EPA receives a request for a waiver, EPA will publish the request and any accompanying material on EPA's official public Internet site, allowing informal public input on the request for at least 15 days before granting or denying the waiver request.

Additionally, EPA has the authority to issue waivers that are national in scope. National waivers may be for specific products or in the public's interest. These waivers can be found at EPA's website at:

<https://www.epa.gov/cwsrf/american-iron-and-steel-requirement-approved-national-waivers-0>.

The "De Minimis Waiver" is noteworthy. The waiver permits the use of iron and steel products when they occur in de minimis incidental components of DWSRF or CWSRF projects, as long as:

1. the funds used for the de minimis incidental components cumulatively comprise no more than 5% of the total cost of the materials used in a project; and,
2. the cost of an individual item does not exceed 1% of the total cost of the materials used in the project.

Items covered by the de minimis waiver are:

1. essential, but incidental to the construction;
2. incorporated into the physical structure of the project; and,
3. often low-cost and bought in bulk.

Examples of "de minimis" items include: washers, screws, nuts, bolts, fasteners, miscellaneous wire, corner bead, ancillary tubing, etc.

Examples of items that are NOT incidental and therefore are not considered "de minimis" include: process fittings, tees, elbows, flanges, brackets, valves, sewer or water pipes for distribution, treatment or storage tanks, large structural support systems, etc.

To use the de minimis waiver, Contractors should prepare a record in spreadsheet form that tracks the cost of all materials incorporated into the project. This spreadsheet can be either project specific or contract specific. If it is contract specific, a material tracking record for each construction contract should be prepared and items that are subject to the AIS de minimis waiver should be highlighted. There should be a clear calculation available to indicate that the cost of the de minimis iron and steel items is 5% or less of the total cost of all materials.

Additional information, guidance and Questions and Answers about the State Revolving Fund American Iron and Steel (AIS) requirement can be found at EPA's website: <https://www.epa.gov/cwsrf/state-revolving-fund-american-iron-and-steel-ais-requirement>.

SECTION 4 GUIDANCE FOR APPLICABLE LABOR STANDARDS

I. Davis-Bacon Act

The Davis-Bacon Act requires Contractors and Subcontractors performing construction, alteration and repair work under Contracts in excess of \$2,000 funded from SRF monies, to pay their laborers and mechanics not less than the prevailing wage and fringe benefits for the geographic location.

For purposes of this section, "State Recipient" means EFC.

A. Requirements for Recipients.

This guidance describes how Recipients assist EPA in meeting its Davis-Bacon (DB) responsibilities when DB applies to EPA awards of financial assistance under the Water Resources Reform and

Development Act of 2014 (WRRDA) with respect to State Recipients and Recipients. Recipients with questions about when DB applies, obtaining the correct DB wage determinations, DB provisions, or compliance monitoring should contact the State Recipient. Recipients can also obtain guidance from DOL's web site at <http://www.dol.gov/whd>.

1. Applicability of the Davis- Bacon (DB) prevailing wage requirements. Under the Water Resources Reform and Development Act of 2014 (WRRDA), DB prevailing wage requirements apply to the construction, alteration, and repair of treatment works carried out in whole or in part with assistance made available by a State water pollution control revolving fund. If a Recipient encounters a unique situation at a site that presents uncertainties regarding DB applicability, the Recipient must discuss the situation with the State Recipient before authorizing work on that site.

2. Obtaining Wage Determinations.

(a) Recipients must obtain the wage determination for the locality in which a covered activity subject to DB will take place prior to issuing requests for bids, proposals, quotes or other methods for soliciting Contracts (solicitation) for activities subject to DB. These wage determinations must be incorporated into solicitations and any subsequent Contracts. Prime Contracts must contain a provision requiring that Subcontractors follow the wage determination incorporated into the prime Contract.

(i) While the solicitation remains open, the Recipient must monitor <https://beta.sam.gov> weekly to ensure that the wage determination contained in the solicitation remains current. Recipients must amend the solicitation if DOL issues a modification more than 10 days prior to the closing date (i.e. bid opening) for the solicitation. If DOL modifies or supersedes the applicable wage determination less than 10 days prior to the closing date, the Recipient may request a finding from the State Recipient that there is not a reasonable time to notify interested Contractors of the modification of the wage determination. The State Recipient will provide a report of its findings to the Recipient.

(ii) If the Recipient does not award the contract within 90 days of the closure of the solicitation, any modifications or supersessions DOL makes to the wage determination contained in the solicitation shall be effective unless the State Recipient, at the request of the Recipient, obtains an extension of the 90 day period from DOL pursuant to 29 CFR 1.6(c)(3)(iv). The Recipient shall monitor <https://beta.sam.gov> on a weekly basis if it does not award the Contract within 90 days of closure of the solicitation to ensure that wage determinations contained in the solicitation remain current.

(b) If the Recipient carries out activity subject to DB by issuing a task order, work assignment or similar instrument to an existing Contractor (ordering instrument) rather than by publishing a solicitation, the Recipient must insert the appropriate DOL wage determination from <https://beta.sam.gov> into the ordering instrument.

(c) Recipients must review all Subcontracts subject to DB entered into by prime Contractors to verify that the prime Contractor has required its Subcontractors to include the applicable wage determinations.

(d) As provided in 29 CFR 1.6(f), DOL may issue a revised wage determination applicable to a Recipient's Contract after the award of a Contract or the issuance of an ordering instrument if DOL determines that the Recipient has failed to incorporate a wage determination or has used a wage determination that clearly does not apply to the Contract or ordering instrument. If this occurs, the Recipient must either terminate the Contract or ordering instrument and issue a revised solicitation or ordering instrument or incorporate DOL's wage determination retroactive to the beginning of the Contract or ordering instrument by change order. The Recipient's Contractor must be compensated for any increases in wages resulting from the use of DOL's revised wage determination.

B. Additional requirements for Recipients that are not governmental entities

Recipients that are not governmental entities must submit their proposed DB wage determinations to the State Recipient for approval prior to including the wage determinations in

any solicitation, Contract or issuing task orders, work assignments, or similar instruments to existing Contractors, as well as ordering instruments unless subsequently directed otherwise by the State Recipient award official as identified below.

Recipients must obtain proposed wage determinations for specific localities at <https://beta.sam.gov> . After the Recipient obtains its proposed wage determination, it must submit the wage determination to the State Recipient award official at: Timothy Burns, P.E., Director, Engineering and Program Management, New York State Environmental Facilities Corporation, at 518-402-7396 or at the following email address: Timothy.Burns@efc.ny.gov.

C. Compliance Verification

(a) The Recipient must periodically interview a sufficient number of employees entitled to DB prevailing wages (covered employees) to verify that Contractors or Subcontractors are paying the appropriate wage rates. As provided in 29 CFR 5.6(a)(6), all interviews must be conducted in confidence. The Recipient must use Standard Form 1445 or equivalent documentation to memorialize the interviews. Copies of the SF 1445 are available from EPA on request.

(b) The Recipient must establish and follow an interview schedule based on its assessment of the risks of noncompliance with DB posed by Contractors or Subcontractors and the duration of the Contract or Subcontract. Recipients must increase the frequency of the interviews if the initial interviews or other information indicates that there is a risk that the Contractor or Subcontractor is not complying with DB. Recipients must immediately conduct necessary interviews in response to an alleged violation of the prevailing wage requirements. All interviews must be conducted in confidence.

(c) The Recipient must periodically conduct spot checks of a representative sample of weekly payroll data to verify that Contractors or Subcontractors are paying the appropriate wage rates. The Recipient must establish and follow a spot check schedule based on its assessment of the risks of noncompliance with DB posed by Contractors or Subcontractors and the duration of the Contract or Subcontract. At a minimum, the Recipient must spot check payroll data within two weeks of each Contractor or Subcontractor's submission of its initial payroll data and two weeks prior to the completion date the Contract or Subcontract. Recipients must conduct more frequent spot checks if the initial spot check or other information indicates that there is a risk that the Contractor or Subcontractor is not complying with DB. In addition, during the examinations the Recipient must verify evidence of fringe benefit plans and payments thereunder by Contractors and Subcontractors who claim credit for fringe benefit contributions.

(d) The Recipient must periodically review Contractors' and Subcontractors' use of apprentices and trainees to verify registration and certification with respect to apprenticeship and training programs approved by either the U.S Department of Labor or a state, as appropriate, and that Contractors and Subcontractors are not using disproportionate numbers of laborers, trainees and apprentices. These reviews must be conducted in accordance with the schedules for spot checks and interviews described in Item (b) and (c) immediately above.

(e) Upon the request of EFC, the Recipient must provide EFC with a written certification indicating whether or not the project is in compliance with the requirements of 29 CFR 5.5(a)(1) based on the most recent payroll copies from Contractors/Subcontractors for the specified week.

(f) Recipients must immediately report potential violations of the DB prevailing wage requirements to the EPA DB contact listed above and to the appropriate DOL Wage and Hour District Office listed at <https://beta.sam.gov> .

II. Responsibilities of Contractors and Subcontractors

After execution of any SRF eligible Contracts, the Contractor and Subcontractor have the following responsibilities:

1. Post Davis Bacon Wage Poster and applicable federal, state, and local wages in a visible area at the construction site. This poster may be found on the EFC website under the

- Resource Library. (Refer to the attached required forms)
2. Make your employees available for wage interviews if necessary. Wage interviews must be conducted confidentially and using Labor Standard Interview Form (SF-1445). (Refer to the attached required forms)
 3. Use federal payroll form WH-347 and complete the certifications on the back. If another form is being used, inform the Recipient and obtain a determination that the form is equivalent to the federal form. (Refer to the attached required forms)
 4. Pay the higher of applicable prevailing federal, state, or local wages, including benefits (fringe & holidays), to each trade and overtime not less than one and one-half times the basic rate of pay for hours in excess of forty hours on Contracts in excess of \$100,000. The wage rates apply to Subcontractor trades as well.
 5. Maintain proof of apprentice and trainee ratios for both Contractor and Subcontractor and certifications onsite.
 6. Pay wages to your employees and your Subcontractors on a weekly basis. Ensure that your Subcontractors are paying their employees weekly.
 7. Ensure that the Subcontracts contain the Davis Bacon contract language, the applicable federal, state, or local wage determinations and equal employment opportunity language. This language is provided in the Part 2: Required Contract Language. Federal wage determinations are available at <https://beta.sam.gov>.
 8. Provide payroll forms and apprentice and trainee certifications to the Recipient for their records.
 9. Report potential waste, fraud and abuse violations to the EPA Davis Bacon Contact and DOL Wages and Hours District Office found on their website. <https://beta.sam.gov>. Any violations in payroll reporting or unpaid wages are subject to a daily monetary penalty.

SECTION 5 GUIDANCE FOR STATE AND/OR LOCAL PREVAILING WAGE REQUIREMENTS

Contractors and Subcontractors working under a public works contract are subject to labor standards under State Labor Law, including but not limited to prevailing wage requirements, and may be subject to additional labor requirements under applicable local laws. When preparing the bid for an SRF project, the Contractor, and any Subcontractors, must use the higher of the applicable prevailing federal, State, or local wage rates paid to each trade.

SECTION 6 GUIDANCE FOR REQUIREMENTS REGARDING SUSPENSION AND DEBARMENT

A list of debarred and suspended contractors, pursuant to 2 CFR Parts 180 and 1532, 29 CFR § 5.12, and Executive Order 11246 is available on the US Department of Labor's website at <https://www.sam.gov/portal/public/SAM>.

A list of contractors and subcontractors deemed ineligible to submit a bid on or be awarded a public contract or subcontract, pursuant to Article 8 of the State Labor Law, is available on the New York State Department of Labor's website at <http://labor.ny.gov/workerprotection/publicwork/PDFs/debarred.pdf>

A list of contractors deemed ineligible to submit a bid is maintained by Empire State Development's Division of Minority and Women's Business Development.

SECTION 7 GUIDANCE FOR RESTRICTIONS ON LOBBYING

Each Contractor and any Subcontractor that has a Contract or Subcontract exceeding \$100,000 shall provide to the Recipient a completed Certification Regarding Lobbying pursuant to 40 CFR Part 34 ("Lobbying Certification") in the form attached hereto as Attachment 9 consistent with the prescribed form provided in Appendix A to 40 CFR Part 34. The form provides a certification that the Contractor or Subcontractor will not expend appropriated federal funds to pay any person for influencing or attempting to influence an officer or employee of any agency, Member of Congress, officer or employee of Congress or any employee of any Member of Congress in accordance with the provisions of 40 CFR Part 34, and to maintain such certification for their own records.

SECTION 8 SUMMARY OF CONTRACTOR REQUIREMENTS FOR SRF-FUNDED PROJECTS

Forms can be found as attachments to this document or online at www.efc.ny.gov

Forms should be submitted electronically via email or through EFC's [dropbox](#)

To be submitted with this bid:

- ☐ Lobbying Certification
- ☐ AIS Contractor's Certification

**Refer to Part 3
Guidance Section**
Section 7
Section 3

To be submitted prior to or upon Contract award:

- ☐ Executed Contracts, Subcontracts, agreements, and purchase orders
- ☐ MWBE Utilization Plan and/or Waiver Request

Section 1

Tasks for construction start:

- ☐ Ensure that all Subcontracts contain Part 2: Required Contract Language
- ☐ Post EEO Poster
- ☐ Pay the higher of prevailing federal, state, or local wages including benefits
- ☐ Post Davis Bacon Wage Poster AND Wage Rates
- ☐ Use Federal Payroll Form (WH-347)
- ☐ Obtain apprentice and trainee certifications
- ☐ Obtain AIS Manufacturer's Certifications for all iron & steel products

Section 1

Section 4

Section 4

Section 4

Section 4

Section 3

Ongoing documentation & tasks:

- ☐ Submit EEO-1 Report, online
- ☐ Submit Monthly MWBE Reports to MBO
- ☐ Maintain weekly certified payrolls for all Prime & Subcontractors
- ☐ Maintain proof of payments for MWBE Subcontractors
- ☐ Maintain AIS Manufacturer's Certifications

Section 1

Section 1

Section 4

Section 1

Section 3

ATTACHMENTS (Required Forms)

Attachment 1 – Monthly MWBE Contractor Compliance Report

New York State Environmental Facilities Corporation
Monthly Minority- & Women- Owned Business Enterprise (MWBE) Contractor Compliance Report
("Monthly MWBE-SDVOB Report")

Instructions:

- Contractors are to complete the report in Word version and email to the Recipient's Minority Business Officer ("MBO") on a monthly basis.
- If you require additional pages, you may find them on EFC's website at www.efc.ny.gov.
- All** MWBE Subcontractors for this contract **MUST** be listed on the form regardless of whether they were paid this month.
- Please save Report as "*MReport – (Project No). – (Municipality) – (Firm Name) – (Date)*" and send the Word version of this document.
- Proofs of payment in the amounts shown below must be transmitted to the MBO with the report.

Municipality:		County:		Contract ID:		Month:	Year:	
Project No.:		GIGP/EPG No:		Registration No. (NYC only):				
Prime Contractor/Service Provider:				Award Date:		Start Date:		
Date all MWBE / SDVOB subs paid in full:								
Signature of Contractor: <input type="checkbox"/> I certify that the information submitted herein is true, accurate and complete to the best of my knowledge and belief. Date:								
Last Month's Contract Amt: \$ Revised Contract Amt: \$ Change Order Amt: \$	MWBE Eligible Amt: \$ (Goals are applied to this amount and includes eligible change orders, amendments & waivers)		EFC MWBE Goals			Total Paid to Prime		
			MBE: % WBE: % Total: %	MBE Amt: \$ WBE Amt: \$ Total Amt: \$		Total Paid this Month: \$ Total Paid to Date: \$		
			EFC SDVOB Goals					
	SDVOB Eligible Amount \$		SDVOB 6 %	SDVOB Amt: \$				
NYS Certified MWBE / SDVOB Contractor & Subcontractor		Please Specify Any Revisions this Month.		Subcontractor Total Amount		Payments this Month	Previous Payments	Total Payments Made to Date
				Original Revised				
Name: Fed. Employer ID#: Choose all that apply: <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVOB <input type="checkbox"/> DSDVBD Control #: MWBE Only - Select Only One: <input type="checkbox"/> Broker ____% <input type="checkbox"/> Supplier <input type="checkbox"/> N/A		<input type="checkbox"/> Subcontractor is REMOVED <input type="checkbox"/> NEW Subcontractor <input type="checkbox"/> Subcontract Amt. INCREASED <input type="checkbox"/> Subcontract Amt. DECREASED						
Name: Fed. Employer ID#: Choose all that apply: <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVOB <input type="checkbox"/> DSDVBD Control #: MWBE Only - Select Only One: <input type="checkbox"/> Broker ____% <input type="checkbox"/> Supplier <input type="checkbox"/> N/A		<input type="checkbox"/> Subcontractor is REMOVED <input type="checkbox"/> NEW Subcontractor <input type="checkbox"/> Subcontract Amt. INCREASED <input type="checkbox"/> Subcontract Amt. DECREASED						

New York State Environmental Facilities Corporation
Monthly Minority- & Women- Owned Business Enterprise (MWBE) Contractor Compliance Report
("Monthly MWBE-SDVOB Report")

NYS Certified M/WBE / SDVOB Contractor & Subcontractor	Please Specify Any Revisions this Month.	Subcontractor Contract Amount		Payments this Month	Previous Payments	Total Payments Made to Date
		Original	Revised			
Name: Fed. Employer ID#: <u>Choose all that apply:</u> <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVOB <input type="checkbox"/> DSDVBD Control #: <u>MWBE Only - Select Only One:</u> <input type="checkbox"/> Broker ___% <input type="checkbox"/> Supplier <input type="checkbox"/> N/A	<input type="checkbox"/> Subcontractor is REMOVED <input type="checkbox"/> NEW Subcontractor <input type="checkbox"/> Subcontract Amt. INCREASED <input type="checkbox"/> Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: <u>Choose all that apply:</u> <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVOB <input type="checkbox"/> DSDVBD Control #: <u>MWBE Only - Select Only One:</u> <input type="checkbox"/> Broker ___% <input type="checkbox"/> Supplier <input type="checkbox"/> N/A	<input type="checkbox"/> Subcontractor is REMOVED <input type="checkbox"/> NEW Subcontractor <input type="checkbox"/> Subcontract Amt. INCREASED <input type="checkbox"/> Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: <u>Choose all that apply:</u> <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVOB <input type="checkbox"/> DSDVBD Control #: <u>MWBE Only - Select Only One:</u> <input type="checkbox"/> Broker ___% <input type="checkbox"/> Supplier <input type="checkbox"/> N/A	<input type="checkbox"/> Subcontractor is REMOVED <input type="checkbox"/> NEW Subcontractor <input type="checkbox"/> Subcontract Amt. INCREASED <input type="checkbox"/> Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: <u>Choose all that apply:</u> <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVOB <input type="checkbox"/> DSDVBD Control #: <u>MWBE Only - Select Only One:</u> <input type="checkbox"/> Broker ___% <input type="checkbox"/> Supplier <input type="checkbox"/> N/A	<input type="checkbox"/> Subcontractor is REMOVED <input type="checkbox"/> NEW Subcontractor <input type="checkbox"/> Subcontract Amt. INCREASED <input type="checkbox"/> Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: <u>Choose all that apply:</u> <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVOB <input type="checkbox"/> DSDVBD Control #: <u>MWBE Only - Select Only One:</u> <input type="checkbox"/> Broker ___% <input type="checkbox"/> Supplier <input type="checkbox"/> N/A	<input type="checkbox"/> Subcontractor is REMOVED <input type="checkbox"/> NEW Subcontractor <input type="checkbox"/> Subcontract Amt. INCREASED <input type="checkbox"/> Subcontract Amt. DECREASED					

New York State Environmental Facilities Corporation
Monthly Minority- & Women- Owned Business Enterprise (MWBE) Contractor Compliance Report
("Monthly MWBE-SDVOB Report")

NYS Certified M/WBE / SDVOB Contractor & Subcontractor	Please Specify Any Revisions this Month.	Subcontractor Total Amount		Payments this Month	Previous Payments	Total Payments Made to Date
		Original	Revised			
Name: Fed. Employer ID#: <u>Choose all that apply:</u> <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVOB <input type="checkbox"/> DSDVBD Control #: <u>MWBE Only - Select Only One:</u> <input type="checkbox"/> Broker __% <input type="checkbox"/> Supplier <input type="checkbox"/> N/A	<input type="checkbox"/> Subcontractor is REMOVED <input type="checkbox"/> NEW Subcontractor <input type="checkbox"/> Subcontract Amt. INCREASED <input type="checkbox"/> Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: <u>Choose all that apply:</u> <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVOB <input type="checkbox"/> DSDVBD Control #: <u>MWBE Only - Select Only One:</u> <input type="checkbox"/> Broker __% <input type="checkbox"/> Supplier <input type="checkbox"/> N/A	<input type="checkbox"/> Subcontractor is REMOVED <input type="checkbox"/> NEW Subcontractor <input type="checkbox"/> Subcontract Amt. INCREASED <input type="checkbox"/> Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: <u>Choose all that apply:</u> <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVOB <input type="checkbox"/> DSDVBD Control #: <u>MWBE Only - Select Only One:</u> <input type="checkbox"/> Broker __% <input type="checkbox"/> Supplier <input type="checkbox"/> N/A	<input type="checkbox"/> Subcontractor is REMOVED <input type="checkbox"/> NEW Subcontractor <input type="checkbox"/> Subcontract Amt. INCREASED <input type="checkbox"/> Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: <u>Choose all that apply:</u> <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVOB <input type="checkbox"/> DSDVBD Control #: <u>MWBE Only - Select Only One:</u> <input type="checkbox"/> Broker __% <input type="checkbox"/> Supplier <input type="checkbox"/> N/A	<input type="checkbox"/> Subcontractor is REMOVED <input type="checkbox"/> NEW Subcontractor <input type="checkbox"/> Subcontract Amt. INCREASED <input type="checkbox"/> Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: <u>Choose all that apply:</u> <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVOB <input type="checkbox"/> DSDVBD Control #: <u>MWBE Only - Select Only One:</u> <input type="checkbox"/> Broker __% <input type="checkbox"/> Supplier <input type="checkbox"/> N/A	<input type="checkbox"/> Subcontractor is REMOVED <input type="checkbox"/> NEW Subcontractor <input type="checkbox"/> Subcontract Amt. INCREASED <input type="checkbox"/> Subcontract Amt. DECREASED					

New York State Environmental Facilities Corporation
Monthly Minority- & Women- Owned Business Enterprise (MWBE) Contractor Compliance Report
("Monthly MWBE-SDVOB Report")

NYS Certified M/WBE / SDVOB Contractor & Subcontractor	Please Specify Any Revisions this Month.	Subcontractor Total Amount		Payments this Month	Previous Payments	Total Payments Made to Date
		Original	Revised			
Name: Fed. Employer ID#: Choose all that apply: <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVOB <input type="checkbox"/> DSDVBD Control #: MWBE Only - Select Only One: <input type="checkbox"/> Broker __% <input type="checkbox"/> Supplier <input type="checkbox"/> N/A	<input type="checkbox"/> Subcontractor is REMOVED <input type="checkbox"/> NEW Subcontractor <input type="checkbox"/> Subcontract Amt. INCREASED <input type="checkbox"/> Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: Choose all that apply: <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVOB <input type="checkbox"/> DSDVBD Control #: MWBE Only - Select Only One: <input type="checkbox"/> Broker __% <input type="checkbox"/> Supplier <input type="checkbox"/> N/A	<input type="checkbox"/> Subcontractor is REMOVED <input type="checkbox"/> NEW Subcontractor <input type="checkbox"/> Subcontract Amt. INCREASED <input type="checkbox"/> Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: Choose all that apply: <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVOB <input type="checkbox"/> DSDVBD Control #: MWBE Only - Select Only One: <input type="checkbox"/> Broker __% <input type="checkbox"/> Supplier <input type="checkbox"/> N/A	<input type="checkbox"/> Subcontractor is REMOVED <input type="checkbox"/> NEW Subcontractor <input type="checkbox"/> Subcontract Amt. INCREASED <input type="checkbox"/> Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: Choose all that apply: <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVOB <input type="checkbox"/> DSDVBD Control #: MWBE Only - Select Only One: <input type="checkbox"/> Broker __% <input type="checkbox"/> Supplier <input type="checkbox"/> N/A	<input type="checkbox"/> Subcontractor is REMOVED <input type="checkbox"/> NEW Subcontractor <input type="checkbox"/> Subcontract Amt. INCREASED <input type="checkbox"/> Subcontract Amt. DECREASED					
Additional Pages can be found at www.efc.ny.gov TOTAL						
Please explain any revisions and note the scope of work that new subcontractors will be providing. Please note that change orders over \$25K may require that good faith efforts be made to obtain additional participation:						

Attachment 2 – MWBE Utilization Plan

**NYS Environmental Facilities Corporation
Minority- & Women- Owned Business Enterprise (MWBE) Utilization Plan**

Instructions for Contractors & Service Providers:

Contractors and Service Providers must complete Sections 2 and 3. **Submit the completed, signed (electronic signature box checked and dated) form in Microsoft Word format to the Recipient's designated Minority Business Officer (MBO) no later than the date of contract execution.** Incomplete forms will be found deficient. If more than 10 subcontractors are used, additional pages for Section 3 can be found on EFC's website.

If the prime contract is being performed by the parties to a Joint Venture, Teaming Agreement, or Mentor-Protégé Agreement that includes a certified MWBE, please contact EFC for assistance.

MWBE firms must be certified by the NYS Empire State Development Corporation (ESD) in order to be counted towards satisfaction of MWBE participation goals. The utilization of certified MWBEs for non-commercially useful functions may not be counted towards utilization of certified MWBEs in the Utilization Plan. Please note whether a firm is serving as a broker or supplier on the contract. A broker is denoted by NAICS code 425120 and is designated as a broker in ESD's MWBE Directory. A supplier is denoted by a NAICS code beginning with 423 or 424, or a NIGP code that does not begin with the number 9, and is designated as a supplier in ESD's MWBE Directory. If a firm is serving as a broker, please additionally provide the percentage of the broker's commission on the contract.

See the Bid Packet at www.efc.ny.gov or consult your designated MBO for further guidance.

Instructions for Minority Business Officers (MBO):

The MBO must complete Section 1. The MBO may designate an Authorized Representative to complete and submit quarterly payment reports on its behalf, and, if so designated, the MBO's Authorized Representative must also complete Section 1. The Authorized Representative may only submit quarterly payment reports on behalf of the MBO and may not submit any other required forms or reports for the MBO. The MBO must complete Section 1 even if designating an Authorized Representative. **Submit the completed, signed (electronic signature box checked and dated) form in Microsoft Word format via e-mail to your EFC MWBE Representative.**

The subject heading of the e-mail to the EFC MWBE Representative should follow the format "UP, Project Number, Contractor." EFC will review the Utilization Plan and notify the MBO via e-mail of its acceptance or denial.

**NYS Environmental Facilities Corporation
Minority- & Women- Owned Business Enterprise (MWBE) Utilization Plan**

SECTION 1: MUNICIPAL INFORMATION			
Recipient/Municipality:		County:	
Project No.:	GIGP/EPG No.:	Contract ID:	Registration No. (NYC only):
Minority Business Officer:		Email:	Phone #:
Address of MBO:			
Electronic Signature of MBO: <input type="checkbox"/> I certify that the information submitted herein is true, accurate and complete to the best of my knowledge and belief.			Date:
Complete if applicable:			
Authorized Representative:		Title:	
Authorized Rep. Company:		Email:	Phone #:
Electronic Signature of Authorized Rep.: <input type="checkbox"/> I certify that the information submitted herein is true, accurate and complete to the best of my knowledge and belief.			Date:

SECTION 2: PRIME CONTRACTOR / SERVICE PROVIDER INFORMATION				
Firm Name:			Contract Type: <input type="checkbox"/> Construction <input type="checkbox"/> Other Services	
Prime Firm is Certified as: <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> N/A <input type="checkbox"/> Other: Please repeat information in the Utilization Plan below (Section 3). If dual certified, you must select either MBE or WBE.				
Address:		Phone #:	Fed. Employer ID #:	
Description of Work:				
Award Date:	Start Date:	Completion Date:	MWBE GOAL Total	PROPOSED MWBE Participation
Total Contract Amount: \$ MWBE Eligible Contract Amount: \$ (MWBE Goals are applied to this amount and includes all change orders, amendments, & waivers)			MBE: % \$	MBE: % \$
			WBE: % \$	WBE: % \$
			Total: % \$	Total: % \$

**NYS Environmental Facilities Corporation
Minority- & Women- Owned Business Enterprise (MWBE) Utilization Plan**

SECTION 3: MWBE SUBCONTRACTOR INFORMATION				
This Submittal is:	<input type="checkbox"/> The First/Original Utilization Plan <input type="checkbox"/> Revised Utilization Plan #:			
NYS Certified M/WBE Subcontractor Info		Contract Amount:		For EFC Use:
		MBE (\$)	WBE (\$)	
Name:	Fed. Employer ID#:			
Address:	Phone #:			
Scope of Work:	Email:			
Select Only One: <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> Other:	Start Date:			
Select Only One: <input type="checkbox"/> Broker ___% <input type="checkbox"/> Supplier <input type="checkbox"/> N/A	Completion Date:			
Full Contract Amount: \$				
Name:	Fed. Employer ID#:			
Address:	Phone #:			
Scope of Work:	Email:			
Select Only One: <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> Other:	Start Date:			
Select Only One: <input type="checkbox"/> Broker ___% <input type="checkbox"/> Supplier <input type="checkbox"/> N/A	Completion Date:			
Full Contract Amount: \$				
Name:	Fed. Employer ID#:			
Address:	Phone #:			
Scope of Work:	Email:			
Select Only One: <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> Other:	Start Date:			
Select Only One: <input type="checkbox"/> Broker ___% <input type="checkbox"/> Supplier <input type="checkbox"/> N/A	Completion Date:			
Full Contract Amount: \$				
Name:	Fed. Employer ID#:			
Address:	Phone #:			
Scope of Work:	Email:			
Select Only One: <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> Other:	Start Date:			
Select Only One: <input type="checkbox"/> Broker ___% <input type="checkbox"/> Supplier <input type="checkbox"/> N/A	Completion Date:			
Full Contract Amount: \$				

**NYS Environmental Facilities Corporation
Minority- & Women- Owned Business Enterprise (MWBE) Utilization Plan**

SECTION 3: M/WBE SUBCONTRACTOR INFORMATION continued				
Name:	Fed. Employer ID#:			
Address:	Phone #:			
Scope of Work:	Email:			
Select Only One: <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> Other:	Start Date:			
Select Only One: <input type="checkbox"/> Broker ___% <input type="checkbox"/> Supplier <input type="checkbox"/> N/A	Completion Date:			
Full Contract Amount: \$				
Name:	Fed. Employer ID#:			
Address:	Phone #:			
Scope of Work:	Email:			
Select Only One: <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> Other:	Start Date:			
Select Only One: <input type="checkbox"/> Broker ___% <input type="checkbox"/> Supplier <input type="checkbox"/> N/A	Completion Date:			
Full Contract Amount: \$				
Name:	Fed. Employer ID#:			
Address:	Phone #:			
Scope of Work:	Email:			
Select Only One: <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> Other:	Start Date:			
Select Only One: <input type="checkbox"/> Broker ___% <input type="checkbox"/> Supplier <input type="checkbox"/> N/A	Completion Date:			
Full Contract Amount: \$				
Name:	Fed. Employer ID#:			
Address:	Phone #:			
Scope of Work:	Email:			
Select Only One: <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> Other:	Start Date:			
Select Only One: <input type="checkbox"/> Broker ___% <input type="checkbox"/> Supplier <input type="checkbox"/> N/A	Completion Date:			
Full Contract Amount: \$				
SIGNATURE				
Electronic Signature of Contractor: <input type="checkbox"/> I certify that the information submitted herein is true, accurate and complete to the best of my knowledge and that all MWBE subcontractors will perform a commercially useful function. Name (Please Type):				Date:

Attachment 3 – MWBE Waiver Request

**New York State Environmental Facilities Corporation
Minority & Women Owned Business Enterprise (MWBE) Waiver Request Form**

Instructions for Contractors & Service Providers:

Contractors and Service Providers must complete Sections 2, 3, and 4. **Submit the completed, signed (electronic signature box checked and dated) form in Microsoft Word format to the Recipient's designated Minority Business Officer (MBO).** Incomplete forms will be found deficient.

See the Bid Packet at www.efc.ny.gov or consult your designated MBO for further guidance.

Instructions for Minority Business Officers (MBO):

The MBO must complete Section 1. **Submit the completed, signed (electronic signature box checked and dated) form in Microsoft Word format via e-mail to your EFC MWBE Representative.** The subject heading of the e-mail to the EFC MWBE Representative should follow the format "Waiver Request, Project Number, Contractor." EFC will review and notify the MBO via e-mail of its acceptance or denial.

If a partial MWBE waiver is requested, an MWBE Utilization Plan must also be submitted for the amount of proposed MWBE participation.

SECTION 1: MUNICIPAL INFORMATION				
Recipient/Municipality:			County:	
Project No.:	GIGP/EPG No.:	Contract ID:	Registration No. (NYC only):	
Minority Business Officer (MBO):		Email:	Phone #:	
Address of MBO:				
Signature of MBO: <input type="checkbox"/> I certify that the information submitted herein is true, accurate and complete to the best of my knowledge and belief.				Date:

SECTION 2: PRIME CONTRACTOR / SERVICE PROVIDER INFORMATION				
Firm Name:			Contract Type: <input type="checkbox"/> Construction <input type="checkbox"/> Other Services	
Prime Firm is Certified as: <input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> N/A <input type="checkbox"/> Other:				
Address:		Phone #:	Fed. Employer ID #:	
Contact Information of Firm Representative Authorized to Discuss Waiver Request:				
Name:	Title:	Phone #:	E-mail:	
Description of Work:			EFC MWBE GOAL Total	
Award Date:	Start Date:	Completion Date:	MBE: % \$	
Total Contract Amount: \$ MWBE Eligible Contract Amount: \$ (MWBE Goals are applied to this amount and includes all change orders, amendments, & waivers)			WBE: % \$	
			Total: % \$	

**New York State Environmental Facilities Corporation
Minority & Women Owned Business Enterprise (MWBE) Waiver Request Form**

SECTION 3: TYPE OF MWBE WAIVER REQUESTED

1. ☐ **Full Waiver** (No MWBE participation)
2. ☐ **Partial Waiver** (Less than the MWBE goals; indicate below the proposed MWBE participation)

PROPOSED MWBE Participation

MBE: % \$

WBE: % \$

Total: % \$

3. ☐ **Specialty Equipment/Services Exclusion** (Must be of SIGNIFICANT cost - list of equipment and cost must be attached in addition to the supporting documentation outlined below)

SECTION 4: SUPPORTING DOCUMENTATION

To be considered, the Request for Waiver Form must be accompanied by the documentation requested in items 1 – 9, as listed below. If a Specialty Equipment Exclusion is requested, it must be accompanied by the documentation requested in items 1 - 13. If a Specialty Services Exclusion is requested, it must be accompanied by the items requested in items 1 – 9 and item 14. Copies of the following information and all relevant supporting documentation must be submitted along with the request. Please contact EFC for assistance, including sample documentation.

1. A letter of explanation setting forth your basis for requesting a partial or total waiver and detailing the good faith efforts that were made.
2. Copies of advertisements in any general circulation, trade association, and minority- and women-oriented publications in which you solicited MWBEs for the purposes of complying with your participation goals, with the dates of publication.
3. Screenshots of search results (by business description or commodity code) from Empire State Development Corporation's (ESD) MWBE Directory of all certified MWBEs that were solicited for purposes of complying with your MWBE participation goals.
4. Copies of faxes, letters, or e-mails sent to MWBE firms to solicit participation and their responses.
5. A log of solicitation results, consisting of the list of MWBE firms solicited for the contract and the outcome of the solicitations. The log should be broken out into separate areas for each task that is solicited (e.g., trucking, materials, electricians) and clearly provide a rationale for firms included on the completed Utilization Plan as well as for those not chosen. The log should show: that each MWBE firm was contacted twice by two different methods (e.g., fax and phone); who was spoken to; what was said; and the final outcome of the solicitation.
6. A description of any contract documents, plans, or specifications made available to MWBEs for purposes of soliciting their bids and the date and manner in which these documents were made available. Specifically, include information on the scope of work in the contract and a breakout of tasks or equipment, such as

**New York State Environmental Facilities Corporation
Minority & Women Owned Business Enterprise (MWBE) Waiver Request Form**

a schedule of values for a construction contract or a proposal or excerpt from a professional services agreement.

7. Documentation of any negotiations between you, the Contractor, and the MWBEs undertaken for purposes of complying with your MWBE participation goals.
8. Any other information you deem relevant which may help us in evaluating your request for a waiver. Examples may include sign-in sheets from any pre-bid meetings where MWBE firms were invited, attendance at MWBE forums, etc.
9. EFC and the MBO reserve the right to request additional information and/or documentation.

Additional Documentation for Requests for Specialty Equipment Exclusions:

10. Copies of the appropriate pages of the technical specification related to the equipment showing the choices for manufacturers or other information that limits the choice of vendor.
11. Letter, e-mail or screenshot of website from the manufacturer listing their distributors in NYS and the locations.
12. Screenshots of ESD's MWBE Directory searches for the manufacturer and distributor showing that they are not found in the Directory.
13. An invoice or executed purchase order showing the value of the equipment.

Additional Documentation for Requests for Specialty Service Exclusions:

14. A letter of explanation containing information about the scope of work and why no MWBE firms could be subcontracted to provide that service.

Note: Unless a Total Waiver has been granted, Firms will be required to submit all reports and documents pursuant to the provisions set forth in the procurement and/or contract, as deemed appropriate by EFC, to determine MWBE compliance. In cases where EFC accepts a full or partial waiver of MWBE participation goals, the waiver request will be posted to EFC's website.

SIGNATURE

Electronic Signature of Contractor:

☐ I certify that the information submitted herein is true, accurate and complete to the best of my knowledge.

Name: (Please Type):

Date:

Attachment 4 – Lobbying Certification



Environmental Facilities Corporation

**New York State Environmental Facilities Corporation
CERTIFICATION REGARDING LOBBYING
FOR
CONTRACTS, GRANTS, LOANS, AND
COOPERATIVE AGREEMENTS
40 CFR Part 34**

SRF Project No.: _____

The undersigned certifies, to the best of his or her knowledge and belief, that:

- (1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- (2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- (3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

Signature: _____

Name: _____

Title: _____

Company Name: _____

Date: _____

Contract ID: _____

Attachment 5 – AIS Contractor’s Certification



Environmental Facilities Corporation

AIS CONTRACTOR CERTIFICATION
FOR CONSTRUCTION CONTRACTS PAID FOR WITH FUNDS FROM
THE NYS CLEAN WATER STATE REVOLVING FUND OR
THE NYS DRINKING WATER STATE REVOLVING FUND VIA THE
NYS ENVIRONMENTAL FACILITIES CORPORATION

Project Title: _____

Contractor's Name: _____

Contract ID: _____

SRF Project #: _____

SRF Recipient Name: _____

I certify that the iron and steel products that will be permanently incorporated into the public water system or wastewater treatment works project under this construction contract will have been produced in the United States, in accordance with the requirements of the US Environmental Protection Agency. I will also develop and maintain at the project location the necessary documentation to demonstrate that the iron and steel products incorporated into the project were produced in the United States, and make such documentation available to The NYS Environmental Facilities Corporation or their authorized representatives, upon request.

Signature: _____

Name (print): _____

Title: _____

Date: _____

Attachment 6 – AIS Manufacturer’s Certification

1. The following information is provided as a manufacturer's sample letter of **step** certification for AIS compliance. Documentation must be provided on company letterhead.

Date

Company Name

Company Address

City, State Zip

Subject: American Iron and Steel Step Certification for Project (XXXXXXXXXX)

I, (company representative), certify that the (melting, bending, coating, galvanizing, cutting, etc.) process for (manufacturing or fabricating) the following products and/or materials shipped or provided for the subject project is in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

Item, Products and/or Materials:

1. Xxx

2. Xxx

3. Xxx

Such process took place at the following location: _____

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

[Signed by company representative]

2. The following information is provided as a manufacturer's sample letter of certification for AIS compliance. Documentation must be provided on company letterhead.

Date

Company Name

Company Address

City, State Zip

Subject: American Iron and Steel Certification for Project (XXXXXXXXXX)

I, (company representative), certify that the following products and/or materials shipped/provided to the subject project are in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

Item, Products and/or Materials:

1. Xxx

2. Xxx

3. Xxx

Such process took place at the following location: _____

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

[Signed by company representative]

Attachment 7 – Federal Payroll Form (WH-347)

PAYROLL
(For Contractor's Optional Use; See Instructions at www.dol.gov/whd/forms/wh347instr.htm)



Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number.

Rev. Dec. 2008

OMB No.: 1235-0008
Expires: 02/28/2018

NAME OF CONTRACTOR <input type="checkbox"/>				OR SUBCONTRACTOR <input type="checkbox"/>				ADDRESS													
PAYROLL NO.				FOR WEEK ENDING				PROJECT AND LOCATION										PROJECT OR CONTRACT NO.			
(1)		(2)	(3)	OT OR ST	(4) DAY AND DATE								(5)	(6)	(7)	(8) DEDUCTIONS					(9)
NAME AND INDIVIDUAL IDENTIFYING NUMBER (e.g., LAST FOUR DIGITS OF SOCIAL SECURITY NUMBER) OF WORKER		NO. OF WITHHOLDING EXEMPTIONS	WORK CLASSIFICATION		HOURS WORKED EACH DAY								TOTAL HOURS	RATE OF PAY	GROSS AMOUNT EARNED	FICA	WITH-HOLDING TAX		OTHER	TOTAL DEDUCTIONS	NET WAGES PAID FOR WEEK
				O																	
				S																	
				O																	
				S																	
				O																	
				S																	
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While completion of Form WH-347 is optional, it is mandatory for covered contractors and subcontractors performing work on Federally financed or assisted construction contracts to respond to the information collection contained in 29 C.F.R. §§ 3.3, 5.5(a). The Copeland Act (40 U.S.C. § 3145) contractors and subcontractors performing work on Federally financed or assisted construction contracts to "furnish weekly a statement with respect to the wages paid each employee during the preceding week." U.S. Department of Labor (DOL) regulations at 29 C.F.R. § 5.5(a)(3)(ii) require contractors to submit weekly a copy of all payrolls to the Federal agency contracting for or financing the construction project, accompanied by a signed "Statement of Compliance" indicating that the payrolls are correct and complete and that each laborer or mechanic has been paid not less than the proper Davis-Bacon prevailing wage rate for the work performed. DOL and federal contracting agencies receiving this information review the information to determine that employees have received legally required wages and fringe benefits.

Public Burden Statement

We estimate that it will take an average of 55 minutes to complete this collection, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding these estimates or any other aspect of this collection, including suggestions for reducing this burden, send them to the Administrator, Wage and Hour Division, U.S. Department of Labor, Room S3502, 200 Constitution Avenue, N.W. Washington, D.C. 20210

Date _____

I, _____
(Name of Signatory Party) (Title)

do hereby state:

(1) That I pay or supervise the payment of the persons employed by _____ on the _____
(Contractor or Subcontractor)
_____ ; that during the payroll period commencing on the _____
(Building or Work)
_____ day of _____, _____, and ending the _____ day of _____, _____,
all persons employed on said project have been paid the full weekly wages earned, that no rebates have
been or will be made either directly or indirectly to or on behalf of said
_____ from the full
(Contractor or Subcontractor)

weekly wages earned by any person and that no deductions have been made either directly or indirectly
from the full wages earned by any person, other than permissible deductions as defined in Regulations, Part
3 (29 C.F.R. Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948,
63 Stat. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. § 3145), and described below:

(2) That any payrolls otherwise under this contract required to be submitted for the above period are
correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the
applicable wage rates contained in any wage determination incorporated into the contract; that the classifications
set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide apprenticeship
program registered with a State apprenticeship agency recognized by the Bureau of Apprenticeship and
Training, United States Department of Labor, or if no such recognized agency exists in a State, are registered
with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That:

(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

☐ — in addition to the basic hourly wage rates paid to each laborer or mechanic listed in
the above referenced payroll, payments of fringe benefits as listed in the contract
have been or will be made to appropriate programs for the benefit of such employees,
except as noted in section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

☐ — Each laborer or mechanic listed in the above referenced payroll has been paid,
as indicated on the payroll, an amount not less than the sum of the applicable
basic hourly wage rate plus the amount of the required fringe benefits as listed
in the contract, except as noted in section 4(c) below.

(c) EXCEPTIONS

EXCEPTION (CRAFT)	EXPLANATION

REMARKS:

NAME AND TITLE	SIGNATURE

THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR
SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE
31 OF THE UNITED STATES CODE.

Attachment 8 – EEO Poster

Employee Contact
For EEO Compliance:



Equal Employment Opportunity is **THE LAW**

Private Employers, State and Local Governments, Educational Institutions, Employment Agencies and Labor Organizations

Applicants to and employees of most private employers, state and local governments, educational institutions, employment agencies and labor organizations are protected under Federal law from discrimination on the following bases:

RACE, COLOR, RELIGION, SEX, NATIONAL ORIGIN

Title VII of the Civil Rights Act of 1964, as amended, protects applicants and employees from discrimination in hiring, promotion, discharge, pay, fringe benefits, job training, classification, referral, and other aspects of employment, on the basis of race, color, religion, sex (including pregnancy), or national origin. Religious discrimination includes failing to reasonably accommodate an employee's religious practices where the accommodation does not impose undue hardship.

DISABILITY

Title I and Title V of the Americans with Disabilities Act of 1990, as amended, protect qualified individuals from discrimination on the basis of disability in hiring, promotion, discharge, pay, fringe benefits, job training, classification, referral, and other aspects of employment. Disability discrimination includes not making reasonable accommodation to the known physical or mental limitations of an otherwise qualified individual with a disability who is an applicant or employee, barring undue hardship.

AGE

The Age Discrimination in Employment Act of 1967, as amended, protects applicants and employees 40 years of age or older from discrimination based on age in hiring, promotion, discharge, pay, fringe benefits, job training, classification, referral, and other aspects of employment.

SEX (WAGES)

In addition to sex discrimination prohibited by Title VII of the Civil Rights Act, as amended, the Equal Pay Act of 1963, as amended, prohibits sex discrimination in the payment of wages to women and men performing substantially equal work, in jobs that require equal skill, effort, and responsibility, under similar working conditions, in the same establishment.

GENETICS

Title II of the Genetic Information Nondiscrimination Act of 2008 protects applicants and employees from discrimination based on genetic information in hiring, promotion, discharge, pay, fringe benefits, job training, classification, referral, and other aspects of employment. GINA also restricts employers' acquisition of genetic information and strictly limits disclosure of genetic information. Genetic information includes information about genetic tests of applicants, employees, or their family members; the manifestation of diseases or disorders in family members (family medical history); and requests for or receipt of genetic services by applicants, employees, or their family members.

RETALIATION

All of these Federal laws prohibit covered entities from retaliating against a person who files a charge of discrimination, participates in a discrimination proceeding, or otherwise opposes an unlawful employment practice.

WHAT TO DO IF YOU BELIEVE DISCRIMINATION HAS OCCURRED

There are strict time limits for filing charges of employment discrimination. To preserve the ability of EEOC to act on your behalf and to protect your right to file a private lawsuit, should you ultimately need to, you should contact EEOC promptly when discrimination is suspected:

The U.S. Equal Employment Opportunity Commission (EEOC), 1-800-669-4000 (toll-free) or 1-800-669-6820 (toll-free TTY number for individuals with hearing impairments). EEOC field office information is available at www.eeoc.gov or in most telephone directories in the U.S. Government or Federal Government section. Additional information about EEOC, including information about charge filing, is available at www.eeoc.gov.

Employers Holding Federal Contracts or Subcontracts

Applicants to and employees of companies with a Federal government contract or subcontract are protected under Federal law from discrimination on the following bases:

RACE, COLOR, RELIGION, SEX, NATIONAL ORIGIN

Executive Order 11246, as amended, prohibits job discrimination on the basis of race, color, religion, sex or national origin, and requires affirmative action to ensure equality of opportunity in all aspects of employment.

INDIVIDUALS WITH DISABILITIES

Section 503 of the Rehabilitation Act of 1973, as amended, protects qualified individuals from discrimination on the basis of disability in hiring, promotion, discharge, pay, fringe benefits, job training, classification, referral, and other aspects of employment. Disability discrimination includes not making reasonable accommodation to the known physical or mental limitations of an otherwise qualified individual with a disability who is an applicant or employee, barring undue hardship. Section 503 also requires that Federal contractors take affirmative action to employ and advance in employment qualified individuals with disabilities at all levels of employment, including the executive level.

DISABLED, RECENTLY SEPARATED, OTHER PROTECTED, AND ARMED FORCES SERVICE MEDAL VETERANS

The Vietnam Era Veterans' Readjustment Assistance Act of 1974, as amended, 38 U.S.C. 4212, prohibits job discrimination and requires affirmative action to employ and advance in employment disabled veterans, recently separated veterans (within

three years of discharge or release from active duty), other protected veterans (veterans who served during a war or in a campaign or expedition for which a campaign badge has been authorized), and Armed Forces service medal veterans (veterans who, while on active duty, participated in a U.S. military operation for which an Armed Forces service medal was awarded).

RETALIATION

Retaliation is prohibited against a person who files a complaint of discrimination, participates in an OFCCP proceeding, or otherwise opposes discrimination under these Federal laws.

Any person who believes a contractor has violated its nondiscrimination or affirmative action obligations under the authorities above should contact immediately:

The Office of Federal Contract Compliance Programs (OFCCP), U.S. Department of Labor, 200 Constitution Avenue, N.W., Washington, D.C. 20210, 1-800-397-6251 (toll-free) or (202) 693-1337 (TTY). OFCCP may also be contacted by e-mail at OFCCP-Public@dol.gov, or by calling an OFCCP regional or district office, listed in most telephone directories under U.S. Government, Department of Labor.

Programs or Activities Receiving Federal Financial Assistance

RACE, COLOR, NATIONAL ORIGIN, SEX

In addition to the protections of Title VII of the Civil Rights Act of 1964, as amended, Title VI of the Civil Rights Act of 1964, as amended, prohibits discrimination on the basis of race, color or national origin in programs or activities receiving Federal financial assistance. Employment discrimination is covered by Title VI if the primary objective of the financial assistance is provision of employment, or where employment discrimination causes or may cause discrimination in providing services under such programs. Title IX of the Education Amendments of 1972 prohibits employment discrimination on the basis of sex in educational programs or activities which receive Federal financial assistance.

INDIVIDUALS WITH DISABILITIES

Section 504 of the Rehabilitation Act of 1973, as amended, prohibits employment discrimination on the basis of disability in any program or activity which receives Federal financial assistance. Discrimination is prohibited in all aspects of employment against persons with disabilities who, with or without reasonable accommodation, can perform the essential functions of the job.

If you believe you have been discriminated against in a program of any institution which receives Federal financial assistance, you should immediately contact the Federal agency providing such assistance.

Exhibit D

Project Labor Agreement

PROJECT LABOR AGREEMENT

PROJECT LABOR AGREEMENT

BETWEEN

(construction firm)

AND

THE BUILDING AND CONSTRUCTION TRADES COUNCIL OF
WESTCHESTER AND PUTNAM COUNTIES, NEW YORK. AFL-CIO

Saw Mill Pump Station Upgrades

STANDARD (Replace with Contractor / Owner)
PROJECT LABOR AGREEMENT

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PROJECT LABOR AGREEMENT

ARTICLE 1 - PREAMBLE

Whereas: (CONTRACTOR) on behalf of itself and as Construction Manager (CM) desires to perform and complete **UPGRADES TO THE SAW MILL PUMP STATION INCLUDING NEW PUMPING SYSTEMS, INFLUENT GRINDERS, PIPING MODIFICATIONS, CONTROL SYSTEM UPGRADES AND GENERAL BUILDING UPGRADES, ROOF REPLACEMENT, AND ELECTRICAL UPGRADES TO THE SAW MILL PUMP STATION INCLUDING A NEW BACK-UP PROPANE/NATURAL GAS GENERATOR AND SERVICE GEAR** in a manner designed to afford the lowest reasonable costs to VILLAGE/TOWN OF MOUNT KISCO (OWNER)

WHEREAS, this Project Labor Agreement will foster the achievement of these goals, inter alia, by:

- (1) avoiding the costly delays of potential strikes, slowdowns, walkouts, picketing and other disruptions arising from work disputes and promote labor harmony and peace for the duration of the Project;
- (2) standardizing the terms and conditions governing the employment of labor on the Project;
- (3) permitting wide flexibility in work scheduling and shift hours and times, including flexibility designed to meet the special needs of this Project;
- (4) including negotiated adjustments to work rules and staffing requirements from those which otherwise might obtain;

PROJECT LABOR AGREEMENT

- (5) providing comprehensive and standardized mechanisms for the settlement of work disputes, including those relating to jurisdiction;
- (6) ensuring a reliable source of skilled and experienced labor;
- (7) furthering public policy objectives as to employment opportunities for minorities and women and improved opportunities for minority and women-owned business in the construction industry;
- (8) ensuring appropriate security precautions during the life of the Project;
- (9) minimizing the potential losses of revenues through timely completion of contracts;

And

- (10) expediting the construction process and otherwise minimizing the inconvenience to the Village/Town of Mount Kisco, the citizens of Westchester County, the surrounding business entities, and the public; and

WHEREAS, the signatory Unions desire the stability, security and work opportunities afforded by a Project Labor Agreement; and,

WHEREAS, the Parties desire to maximize Project safety conditions for both workers and the public;

NOW, THEREFORE, the Parties enter into this Agreement:

SECTION 1. PARTIES TO THE AGREEMENT

This is a Project Labor Agreement ("Agreement") entered into by and between

_____ CONSTRUCTION (CM) and its successors and assigns on its own

PROJECT LABOR AGREEMENT

behalf and on behalf of all other contractors and subcontractors (hereinafter "Contractor, Contractors or Sub Contractors) engaged in on-site project work, and by the Building and Construction Trades Council of Westchester and Putnam Counties, New York, AFL-CIO ("Council"), on behalf of itself and its affiliated local union members; and the signatory Local Unions on behalf of themselves and their members. It is understood that if the CM is changed, the successor CM shall assume all terms and conditions of this Agreement for certain construction work anticipated to be performed on the project

ARTICLE 2 - GENERAL CONDITIONS

SECTION 1. DEFINITIONS

Throughout this Agreement, the Union parties and the signatory Local Unions and the Council are referred to singularly and collectively as "**Union(s)**" where specific reference is made to "**Local Unions**" that phrase is sometimes used;

The term "**Contractor(s)**" shall include CM and all other signatory contractors, and their subcontractors of whatever tier, engaged in on-site Project Construction Work within the scope of this Agreement as defined in Article 3 and Exhibit C; and the work covered by this Agreement (as defined in Article 3 and Exhibit C) is referred to as the "Project work"

The term "**Employer**" means any contractor or subcontractor working on the Project.

SECTION 2. CONDITIONS FOR AGREEMENT TO BECOME EFFECTIVE

This Agreement shall not become effective unless each of the following conditions are met: (1) the Agreement is signed by the Council on behalf of itself and all of its affiliated Local Unions working on the Project; and, (2) the Agreement is signed by the CM and (3) the Agreement is approved by the Owner. A Union that is not an affiliate of the Council or who

PROJECT LABOR AGREEMENT

elects in writing not to be bound by this Agreement, or an affiliate that is delinquent in the payment of dues to the Council and remains delinquent after 30 days' notice of the delinquency cannot work on the Project.

SECTION 3. ENTITIES BOUND & ADMINISTRATION OF AGREEMENT

A. This Agreement shall be binding on the Council, and its affiliated Local Unions, the CM and all signatory Contractors performing on-site Project work, including site preparation and staging areas, as defined in Article 3 and Exhibit C attached hereto. The CM and the Contractor shall include in any subcontract that they let, for performance during the term of this Agreement, a requirement that their subcontractors, of whatever tier, become signatory and bound by this Agreement with respect to subcontracted work performed within the scope of Article 3 and Exhibit C by signing a Letter of Assent (Exhibit "A"). This Agreement shall be administered by the CM on behalf of all contractors.

SECTION 4. SUPREMACY CLAUSE

This Agreement, together with the local Collective Bargaining Agreements (the "CBA's"), referenced at Exhibit B, copies of which are available for inspection at the Office of the Council represents the complete understanding of all signatories and supersedes any national agreement, local agreement or other collective bargaining agreement of any type which would otherwise apply to this Project, in whole or in part. Where a subject covered by the provisions, explicit or implicit, of this Agreement is also covered by the Exhibit B CBA's, the provisions of this Agreement shall prevail. It is further understood that no Contractor shall be required to sign any other agreement as a condition of performing work on this Project. No practice, understanding or agreement between a Contractor and a Local Union which is not explicitly set forth in this Agreement or the Exhibit B CBA's shall be binding on this Project. It is further agreed that, where there is a conflict the terms and conditions of this Agreement shall supersede

PROJECT LABOR AGREEMENT

and override terms and conditions of any and all National, area, or local collective bargaining agreements, except for all work performed under the NTL Article of Agreement, the National Stack/Chimney Agreement, the National Cooling Tower Agreement, and the National Agreement of the International Union of Elevator Constructors. All instrument calibration work and loop checking shall be performed under the terms of the UA/IBEW Joint National Agreement for Instrument and Control Systems Technicians. This PLA will not affect, nor does it intend to change, a favored nation's clause contained in a Local Union CBA of any affiliate covered by this PLA.

SECTION 5. LIABILITY

The liability of any Contractor and the liability of any Union under this Agreement shall be several and not joint. The CM and any Contractor and any subcontractor shall not be liable for any acts or violations of any other contractor; and the Council and Local Unions shall not be liable for the acts or violation of any other Union.

SECTION 6. THE OWNER

The Owner is not a party to this Agreement and shall not be liable in any manner under this Agreement. It is understood that nothing in this Agreement shall be construed as limiting the sole discretion of the Owner and of the CM in determining which Contractors shall be awarded contracts for Project Work as long as the Contractor signs the Letter of Assent. It is further understood that the Owner has sole discretion at any time to terminate, delay or suspend the work, in whole or in part, on this Project. It is further understood that the Owner shall have the right to access, use, or occupy any parts of the Project that is completed or partly completed and to install Owner-provided equipment and furnishings therein. The Contractors, the Council and the Local Unions shall accommodate and cooperate with the Owner's use, occupancy and furnishing of these parts of the Project. CM shall turn the facility, system or space (including without limitation security and

PROJECT LABOR AGREEMENT

maintenance systems and new construction or renovations) over to the Owner upon the Owner's issuance to the CM of a letter of acceptance of the facility, system or space.

SECTION 7. THE CM

The CM shall require in its bid specifications for all work within the scope of Article 3 and Exhibit C that all successful bidders, and their subcontractors of whatever tier, become bound by, and signatory to, this Agreement.

It is understood that nothing in this Agreement shall be construed as limiting the sole discretion of the CM in determining which Contractor or Subcontractor shall be awarded contracts for Project work. It is further understood that the Contractor has sole discretion at any time to terminate, delay or suspend the work, in whole or part, on this Project.

The CM agrees that neither it nor any of its Contractors or Subcontractors will subcontract any work to be done on the Project except to a person, firm or corporation who is or agrees to become party to this Agreement. Any Contractor or subcontractor working on the Project shall, as a condition to working on said Project, become signatory to and perform all work under the terms of this Agreement.

SECTION 8. AVAILABILITY AND APPLICABILITY TO ALL SUCCESSFUL BIDDERS

The Unions agree that this Agreement will be made available to, and will fully apply to any successful bidder for Project work who becomes signatory thereto, without regard to whether that successful bidder performs work at other sites on either a union or non-union basis and without regard to whether employees of such successful bidder are, or are not, members of any unions. This Agreement shall not apply to the work of any Contractor or subcontractor which is performed at any location other than the Project site, as defined in Article 3, Section 1, and Exhibit C.

PROJECT LABOR AGREEMENT

ARTICLE 3 - SCOPE OF THE AGREEMENT

The Project work covered by this Agreement shall be as defined and limited by the following sections of this Article and Exhibit C.

SECTION 1. THE WORK

This Agreement shall only apply to the on-site and off-site construction **work performed at or for the CM on behalf of the Owner at the following Project: VILLAGE/TOWN OF MOUNT KISCO UPGRADES TO THE SAW MILL PUMP STATION INCLUDING NEW PUMPING SYSTEMS, INFLUENT GRINDERS, PIPING MODIFICATIONS, CONTROL SYSTEM UPGRADES AND GENERAL BUILDING UPGRADES, ROOF REPLACEMENT, AND ELECTRICAL UPGRADES TO THE SAW MILL PUMP STATION INCLUDING A NEW BACK-UP PROPANE/NATURAL GAS GENERATOR AND SERVICE GEAR** further described in Exhibit C hereto and only to the extent that the work has been awarded by Owner to the CM. During the term of this Agreement, of the Project will include among other things the following components to the extent that these components have been contracted by the Owner to the CM (i) construction of renovations and upgrades to the Project “On Site” construction work in conjunction with the above shall also include Project Construction Work performed at preparation and staging area.

SECTION 2. EXCLUDED EMPLOYEES AND EXCLUDED WORK

Subject to Article 6, the following work and persons are not subject to the provisions of this Agreement, even though performing Project Work:

1. Superintendents, supervisors excluding general and forepersons specifically covered by an Exhibit B CBA, engineers, licensed architects, inspectors and testers, quality control assurance personnel, timekeepers, mail carriers, clerks, office workers, messengers,

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guards, technicians, non-manual employees, and all professional, engineering administrative and management persons. Excluded employees shall not apply to any general forepersons and field craft surveyors who are performing work traditionally done by members of IUOE Local 15D and/or which is covered by the Local 15D Surveying and Consulting Agreements.

2. Employees or workers of any other public agency, authority, municipality or any other public employer;

3. Employees, workers, entities and sub-contractors engaged in off-Project site manufacture, modifications, repair, maintenance, assembly, painting, handling or fabrication of components, materials, equipment, modules or machinery or involved in deliveries to and from the Project site, except operating vehicles on the Project site and deliveries made within the geographic jurisdiction of the International Brotherhood of Teamsters Local 456 Exhibit B CBA of major building and construction materials as follows: fuel oil for construction vehicles and equipment on the Project site, fill, ready mix concrete, asphalt, sub-base stone/gravel, dynamite concrete block, lumber, and item 4 which are covered by this Agreement;

4. If a tank or pressurized vessel is to be installed on the Project the terms of this Agreement shall not apply to work of the employees that is normally performed under the terms of a National Specialty Agreement including, but not limited to, the National Tank Agreement, the Stack Liner Agreement, the Rubber Line Agreement, or any other Specialty Agreement;

5. Employees or workers of the CM or the Contractor, excepting those performing manual, on-site construction labor who will be covered by this Agreement;

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6. Employees or workers engaged in on-site equipment warranty work (when the Contractor or a subcontractor has on site an employee already certified by the relevant manufacturer to make warranty repairs on that Contractor's equipment, that employee shall be used; when the Contractor or a subcontractor has on site an employee already qualified to make warranty repairs, although not certified by the equipment manufacturer to do so, that employee shall be used to make repairs working under the direction of a manufacturer certified warranty representative). Notwithstanding the foregoing, if a Contractor, in order to satisfy the warranty requirements of a manufacturer, must utilize a person or entity designated by the manufacturer, it may do so without coverage under this Agreement;

7. Employees or workers engaged to perform laboratory or specialty testing or inspections or engaged in geophysical testing (whether land or water) other than boring for core samples;

8. Employees engaged in work ancillary to the Project, performed by third parties, including without limitation performed by electric utilities, gas utilities, water utilities and telephone companies, who are not signatories to this Agreement, provided however that Contractors for teledata, audio-visual, security and television services will limit their work up to a demarcation or terminus point which will be the first point of distribution of system service in the respective building. With respect to entities engaged in such work ancillary to the Project, the Contractor will nonetheless notify those entities of this Project Labor Agreement and that they may participate under this Agreement, if they so choose. To the extent practicable, and within its control, the Contractor will use its best efforts to coordinate ancillary

PROJECT LABOR AGREEMENT

work within the vicinity of construction performed under this PLA to promote labor harmony on the Project;

9. Employees or workers engaged by the Owner even though working on the Project Site while Project Work is under way;

10. Persons engaged in the delivery of Owner-furnished equipment to the Project Site or to any off-site warehouse maintained by Owner;

11. Employees of "Artisans" shall be individuals or entities whom Owner may (or may not) employ directly to create unique, one-of-a-kind decorative elements, including architectural finishes for incorporation into the building;

12. Employees or workers of any entity who are engaged in the final cleaning and housekeeping of all space at the Project Site just prior to occupancy by the Owner. This provision is intended to apply to workers performing the final cleaning and housekeeping that occurs after the clean-up required by the construction and renovation activities contemplated by this Agreement;

13. Employees or workers of any entity who are engaged in operation of building equipment and machinery that are not used in constructing the facilities and are owned or controlled and/or operated by Owner, its architect, engineers and/or its testing inspection firms;

14. Employees or workers of any entity who are engaged in the on-site or off-site maintenance of leased equipment;

15. Employees or workers of any entity who are engaged in work of any kind on

PROJECT LABOR AGREEMENT

the Project Site after this Agreement terminates

SECTION 3. NON-APPLICATION TO CERTAIN ENTITIES

This Agreement shall not apply to the parents, affiliates, subsidiaries, or other joint or sole ventures of the CM, and Contractor or sub-contractor which does not perform work at this Project. It is agreed, for the purposes of this Agreement only, that this Agreement does not have the effect of creating any joint employment, single employer or alter ego status among or between the Owner, the CM, any Contractor or any other state agency, authority, or other municipal or public entity and nothing contained herein shall be construed to prohibit or restrict the Contractor or its employees or any other state or municipal authority, agency or entity and its employees from performing on or off-site work not related to the Project. As the contracts which comprise the Project work are completed and accepted, the Agreement shall have no further force or effect.

ARTICLE 4 - UNION RECOGNITION AND EMPLOYMENT

SECTION 1. PRE-HIRE RECOGNITION

The Contractor and all sub-contractors recognize the signatory Unions as the sole and exclusive bargaining representatives of all craft employees who are performing on-site Project work within the scope of this Agreement as defined in Article 3 and more fully described in Exhibit C.

SECTION 2. UNION REFERRAL

A. The Contractor and all sub-contractors agree to hire for this Project, craft employees covered by this Agreement through the job referral systems and hiring halls (where the referrals meet the qualifications set forth in items 1, 2,3 and 4 of subparagraph (B)

PROJECT LABOR AGREEMENT

established in the Local Unions' area collective bargaining agreements. Notwithstanding this, the Contractor and all sub-contractors shall have sole rights to determine the competency of all referrals; the number of employees required; the selection of employees to be laid-off (except as provided in Article 5, Section 3); and the sole right to reject any applicant referred by a Local Union. In the event that a Local Union is unable to fill any request for qualified employees within a 48 hour period after such requisition is made by the Contractor and all sub-contractors (Saturdays, Sundays and holidays excepted), the Contractor or sub-contractor may employ applicants from any other available source. In the event that the Local Union does not have a job referral system, the Contractor or sub-contractor shall give the Local Union first preference to refer applicants, subject to the other provisions of this Article. The Contractor or sub-contractor shall notify the Local Union of Project craft employees hired within its jurisdiction from any source other than referral by the Union.

B. Consistent with the Exhibit B CBA, The Contractor or a sub-contractor may request by name, and the Local will honor, referral of persons who have applied to the Local for Project work and who meet the following qualifications as determined by a Committee of 3 designated, respectively, by the applicable Local Union, the CM or Contractor or sub-contractor and a mutually selected third party or, in the absence of agreement, the permanent arbitrator (or designee) designated in Article 9:

- (1) Possess any license required by NYS law for the Project work to be performed;
- (2) Have worked a total of at least 1000 hours in the Construction craft during the prior 3 years;

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(3) Were on the Contractor's or sub-contractor's active payroll for at least 60 out of the 180 calendar days prior to the contract award;

(4) Have demonstrated ability to safely perform the basic functions of the applicable trade.

The CM, Contractor or sub-contractor will be initially responsible for determining that new hires meet the requirements established in (1), (2), (3) and (4), as set forth above.

The Exhibit B CBAs will determine the number of employees who shall be hired through the special provisions above (any fraction shall be rounded to the next highest whole number)

The Committee may also allow a Contractor or sub-contractor, subject to any limit expressed in the Exhibit B CBA, to employ trainees (pursuant to Article 13, Section 2) to afford an opportunity to minority, women for entry into the construction industry outside of the formal apprenticeship program.

SECTION 3. NON-DISCRIMINATION IN REFERRALS

The Local Unions represent that their hiring halls and referral systems will be operated in a non-discriminatory manner and in full compliance with all applicable federal, state and local laws and regulations which require equal employment opportunities. Referrals shall not be affected in any way by the rules, regulations, bylaws, constitutional provisions or any other aspects or obligations of union membership, policies or requirements and shall be subject to such other conditions as are established in this Article. No employment applicant shall be discriminated against by any referral system or hiring hall because of the applicant's union membership, or lack thereof.

PROJECT LABOR AGREEMENT

SECTION 4. CROSS AND QUALIFIED REFERRALS

The Local Unions shall not knowingly refer to a Contractor or sub-contractor an employee then employed by another Contractor or sub-contractor working under this Agreement. The Local Unions will exert their best efforts to recruit sufficient numbers of skilled and qualified crafts employees to fulfill the requirements of the Contractor or sub-contractor.

SECTION 5. UNION DUES

All employees covered by this Agreement shall be subject to the union security provisions contained in the applicable Exhibit B CBA's, as amended from time to time, but only for the period of time during which they are performing on-site Project work and only to the extent of rendering payment of the applicable monthly union and administrative or working dues uniformly required for union membership in the Local Union, signatory to this Agreement, which represents the craft in which the employee is performing Project work. No employee shall be discriminated against at the Project site because of the employee's union membership or lack thereof. In the case of unaffiliated employees, the monthly dues payment will be received by the Council as an agency shop fee.

SECTION 6. CRAFT FOREPERSONS AND GENERAL FOREPERSONS

The selection of craft forepersons and/or general forepersons and the number of forepersons required shall be solely the responsibility of the Contractor or sub-contractor except where otherwise provided by specific provisions of an applicable Exhibit B CBA or as agreed to by the parties in a writing specific to this Project, in which case the writing specific to this Project shall govern. All forepersons shall take orders exclusively from the designated Contractor or sub-contractor representatives. Craft forepersons shall be designated as working forepersons at the request of the Contractor or subcontractor, except when an Exhibit B CBA prohibits a foreperson from working when the craft person he is leading exceed a specified number.

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ARTICLE 5 - UNION REPRESENTATION

SECTION 1. LOCAL UNION REPRESENTATIVE

Each Local Union representing on-site Project employees shall be entitled to designate in writing (copy to the Contractor or sub-contractor involved and to CM) one representative, and/or the Business Manager, who shall be afforded access to the Project.

SECTION 2. STEWARDS

A. Each Local Union shall have the right to designate a working journeyman as a Steward (and an alternate who shall serve as a Steward only when the regular Steward is unavailable) and shall notify the Contractor(s) or sub-contractor(s) and CM of the identity of the designated Steward (and alternate) prior to the assumption of such duties with the understanding that at no time shall there be more than one designated Steward and one designated alternate per trade on the Project Site regardless of the number of Contractors on the Project Site.. Stewards shall not exercise supervisory functions and will receive the regular rate of pay for their craft classifications. There will be no non-working Stewards on the Project.

B. In addition to their work as an employee, the Steward shall have the right to receive complaints or grievances and to discuss and assist in their adjustment with the CM's, the Contractor or sub-contractor's appropriate supervisor. Each Steward shall be concerned with the employees of the Steward's Contractor or sub-contractor but not with the employees of any other Contractor or sub-contractor. The CM will not discriminate against the Steward in the proper performance of his Union duties.

C. Stewards shall assist in implementing the Agreement in the spirit of labor management cooperation.

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D Stewards shall not be compensated by the Contractor for Steward work performed away from the Project Site, except to the extent that the duties being performed off-Site relate to the grievance-arbitration procedure of Article 7 or 9 of the Agreement. Stewards shall not be compensated for time spent on Union business which requires the Steward to leave the Project Site.

E The Stewards shall not have the right to determine when overtime shall be worked, or who shall work overtime.

SECTION 3. LAYOFF OF A STEWARD

The Contractor and sub-contractors agree to notify the appropriate Union 24 hours prior to the layoff of a Steward, except in cases of discipline or discharge for just cause. If a Steward is protected against layoff by an Exhibit B CBA, such provisions shall be recognized to the extent the Steward possess the necessary qualifications to perform the work required. In any case in which a Steward is discharged or disciplined for just cause, the Local Union involved shall be notified immediately by the Contractor or sub-contractor.

ARTICLE 6 - MANAGEMENT'S RIGHTS

SECTION 1. RESERVATION OF RIGHTS

Except as expressly limited by a specific provision of this Agreement, the CM, the Contractor and sub-contractor retain full and exclusive authority for the management of their Project operations including, but not limited to: the right to direct the work force, including determination as to the number to be hired and the qualifications therefore; the promotion, transfer, layoff of its employees; or the discipline or discharge for just cause of its employees; the assignment and schedule of work; the promulgation of reasonable Project work rules; and, the requirement, timing and number of employees to be utilized for overtime work. No rules,

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customs, or practices which limit or restrict productivity or efficiency of the individual, as determined by the CM, the Contractor, or sub-contractor and/or joint working efforts with other employees shall be permitted or observed.

SECTION 2. MATERIALS, METHODS & EQUIPMENT

A. There shall be no limitation or restriction upon the Contractor or sub-contractor's choice of materials, modules, techniques, methods, technology or design, or, regardless of source or location, upon the use and installation of equipment, machinery, package units, pre-cast, prefabricated, pre-finished (except that all rebar for use in cast-in-place, on site construction will be cut and bent in accordance with local industry practices), or pre-assembled materials, tools, or other labor-saving devices. Contractors may, without restriction, install or use materials, supplies or equipment regardless of their source. The on-site installation or application of such items shall be performed by the craft having jurisdiction over such work; provided, however, it is recognized that other personnel having special qualifications may participate, in a supervisory capacity, in the installation, check-off or testing of specialized or unusual equipment or facilities as designated by the Contractor or sub-contractor. There shall be no restrictions as to work which is performed off-site for the Project, except that the Contractor and sub-contractors will make reasonable efforts to have pre-assembled duct work produced in shops represented by Sheetmetal Workers Local 38. The Contractor will make reasonable efforts to provide that any equipment or materials under the jurisdiction of the Plumbing and Steamfitting trade shall be accepted and installed by Plumbers, Steamfitters and Apprentices, provided such material or equipment conforms to the National Form of Agreement of the United Association.

B. There shall be no stand-by Trades required for temporary power, light, water, or heat unless requested by the Owner.

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C. The Employer shall subcontract for the delivery of redi-mix concrete and asphalt only to companies whose wages and other economic benefits are equivalent to the area standards established by the Union unless said companies are unable or unwilling to supply redi-mix concrete or asphalt to the Employer.

D Except to the extent otherwise agreed to by the parties in writing, All electrical and electronic work, including but not limited to, the installation, repair and maintenance of all building wiring systems, telephone, data, fire alarm, signs, TV, security wiring and devises, sound and alarm systems and building automation systems, shall be performed under the Local Agreement of IBEW Local 3.

ARTICLE 7 - WORK STOPPAGES AND LOCKOUTS

SECTION 1. NO STRIKES-NO LOCK OUT

There shall be no strikes, sympathy strikes, parades, picketing, bannering, establishment of an inflatable rat or any similar display or signal, work stoppages, slowdowns, hand billing, demonstrations or other disruptive activity at the Project site or any area where on-Site construction work (as defined in Article 3, Section 1) takes place, or other activity otherwise adversely affecting Project work for any reason by any Union or employee against any Contractor, sub-contractor or employer while performing work at the Project site. There shall be no other Union, or concerted or employee activity which disrupts or interferes with the CM's or the Contractors services or the Owner's operations. Failure of any Union or employee to cross any picket line established by any union, signatory or non-signatory to this Agreement, or the picket or demonstration line of any other organization, at the Project site or which otherwise adversely affects Project work or which disrupts or interferes with services to or at the Project Site is a violation of this Article. For the purposes of this Article and Article 10 of this

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Agreement, Project Site shall include each location that compromises the Project and other ancillary sites. There shall be no lockout at the Project by any Contractor or sub-contractors. The CM may stop work on or shut down the Project Site for valid legal or business reasons unrelated to a labor dispute but will make efforts to provide advance notice of a stoppage or work or shutdown. The Contractors and sub-contractors and Unions shall take all steps necessary to ensure compliance with this Section 1 and to ensure uninterrupted construction for the duration of this Agreement. Contractors and sub-contractors and Unions shall take all steps necessary to ensure compliance with this section 1 and to ensure uninterrupted construction at the Project, and ensure the free flow of vehicular or pedestrian traffic within, into and out of the Project Site, for the duration of the Agreement. No jurisdictional dispute shall excuse or justify a violation of this provision.

SECTION 2. DISCHARGE FOR VIOLATION

The Contractor or sub-contractor may discharge any employee violating Section 1, above, and any such employee will not be eligible thereafter for referral under this Agreement.

SECTION 3. NOTIFICATION

If a Contractor contends that any Union has violated this Article, it will notify the appropriate district or area council of the Local Union involved advising of such fact, with copies of the notification to the Local Union, and the Council. The district or area council and the Council shall each instruct, order and otherwise use their best efforts to cause the employees, and/or the Local Unions to immediately cease and desist from any violation of this Article. A district or area council, or the Council complying with these obligations shall not be liable for the unauthorized acts of a Local Union or its members. Similarly, a Local Union and its members will not be liable for any unauthorized acts of the Council.

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SECTION 4. EXPEDITED ARBITRATION

Any Contractor, sub-contractor or Union alleging a violation of Section 1 of this Article may use the expedited procedure set forth below (in lieu of, or in addition to, any actions at law or equity) that may be brought.

A. A party invoking this procedure shall notify Gary Kendellen, J.J. Pierson, and Roger Maher, who shall alternate (beginning with Arbitrator Kendellen) as Arbitrator under this expedited arbitration procedure. If the Arbitrator next on the list is not available to hear the matter within 24 hours of notice, the next Arbitrator on the list shall be called. Copies of such notification will be simultaneously sent to the alleged violator and, if a Local Union is alleged to be in violation, its International, the Council, and the CM.

B. The Arbitrator shall thereupon, after notice as to time and place to the Contractor, the Local Union involved, the Council and the CM, hold a hearing within 48 hours of receipt of the notice invoking the procedure if it is contended that the violation still exists.

C. The sole issue at the hearing shall be whether a violation of Section 1, above, occurred. The Award shall be issued in writing within 3 hours after the close of the hearing, and may be issued without an Opinion.

D. The decision of the Arbitrator shall be final and binding on the involved Contractor, Local Union and employees and the fees and expenses of such arbitrations and the Arbitrator shall be borne equally by the involved Contractor and Local Union.

E. In any proceeding arising under this Article, the CM shall be a party in interest with full right of participation at its option and shall be sent contemporaneous copies of all notifications required to be given under this Article.

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ARTICLE 8 - LABOR MANAGEMENT COMMITTEE

SECTION 1. SUBJECTS

A Project Labor Management Committee will meet on a regular basis to: 1) promote harmonious relations among the CM, the Contractor, the sub-contractor and Unions; 2) enhance safety awareness, cost effectiveness and productivity of construction operations; 3) protect the public interests; 4) discuss matters relating to manning and scheduling with safety and productivity as considerations; and 5) review Affirmative Action and equal opportunity matters pertaining to the Project.

SECTION 2. COMPOSITION

The Committee shall be jointly chaired by designees of the President of the Council and the Executive Manager / Vice President of the CM, The Council and the CM may each designate two representatives to the committee. The Council and the CM may each designate two representatives to the Committee. The Council and the CM may designate additional representatives of the Local Unions and Contractors involved in the issues being discussed. The Committee may conduct business through mutually agreed sub-committees

ARTICLE 9 - GRIEVANCE & ARBITRATION PROCEDURE

SECTION 1. PROCEDURE FOR RESOLUTION OF GRIEVANCES

A. This Agreement is intended to provide close cooperation between management and labor. Each of the Unions will assign a representative to this Project for the purpose of completing the construction of the Project economically, efficiently, continuously, and without interruptions, delays, or work stoppages.

B. The CM, the Contractors, Unions, and the employees, collectively and individually, realize the importance to all parties to maintain continuous and uninterrupted

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performance of the work of the Project, and agree to resolve disputes in accordance with the grievance-arbitration provisions set forth in this Article.

C. Any question or dispute during the term of this agreement shall be subject to the grievance and arbitration process. Further, if an employee covered by this Agreement feels he or she is aggrieved by a violation of this Agreement, he or she, through his or her local union business representative or job steward, shall, within five (5) working days after the Union or the aggrieved employee (s) knows or should have known of the occurrence of the violation, give notice to the work-site representative of the involved Contractor stating the provision(s) alleged to have been violated. The business representative of the local union or the job steward and the work-site representative of the involved Contractor and the Project Contractor shall meet and endeavor to adjust the matter within three (3) working days after timely notice has been given. The representative of the Contractor shall keep the meeting minutes and shall respond to the Union representative in writing (copying the Project Contractor) at the conclusion of the meeting but not later than twenty-four (24) hours thereafter. If they fail to resolve the matter within the prescribed period, the grieving party may, within forty-eight (48) hours thereafter, pursue Step 2 of the Grievance Procedure, provided the grievance is reduced to writing, setting forth the relevant information concerning the alleged grievance, including a short description thereof, the date on which the grievance occurred, and the provision(s) of the Agreement alleged to have been violated.

Step 1:

Should the Local Union(s) or the Project Contractor or any Contractor have a dispute with the other party and, if after conferring, a settlement is not reached within three (3) working

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days, the dispute may be reduced to writing and proceed to Step 2 in the same manner as outlined herein for the adjustment of an employee complaint. Disputes shall include the payment, or non-payment, of Employee Benefit Funds which are not resolved pursuant to Article 11, Section 2.

Step 2:

The International union Representative and the involved Contractor shall meet within seven (7) working days of the referral of a dispute to this second step to arrive at a satisfactory settlement thereof. Meeting minutes shall be kept by the Contractor. If the parties fail to reach an agreement, the dispute may be appealed in writing in accordance with the provisions of Step 3 within seven (7) calendar days thereafter.

Step 3:

A. If the grievance shall have been submitted but not resolved in Step 2, any of the participating Step 2 entities may, within 21 calendar days after the initial Step 2 meeting, submit the grievance in writing (copies to other participants) to one of the designated arbitrators: J.J. Pierson, Richard Adelman, or Roger Maher who shall alternate as arbitrator. The Labor Arbitration Rules of the American Arbitration Association shall govern the conduct of the arbitration hearing, at which all Step 2 participants shall be permitted to participate. The decision of the arbitrator shall be final and binding on the involved Contractor or sub-contractor the Local Union and the grievant and the fees and expenses of such arbitrations shall be borne equally by the involved Contractor or sub-contractor and the Local Union. All arbitrations involving this Project Labor Agreement will be conducted at the offices of the Building Trades Council.

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B. Failure of the grieving party to adhere to the time limits established herein shall render the grievance null and void. The time limits established herein may be extended only by written consent of the parties involved at the particular step where the extension is agreed upon. The Arbitrator shall have the authority to make decisions only on issues presented to him or her and he or she shall not have authority to change, amend, add to or detract from any of the provisions of this Agreement. In the event that an arbitrator award is issued in favor of a Local Union resulting from a violation of Article 2, Section 3 of this Agreement by a subcontractor, and the Local Union cannot enforce the arbitration award against the offending subcontractor after due diligence, the Contractor may be held liable for the damages as set forth in the arbitration award subject to the following:

(1) The Local Union notified the Contractor by certified mail of a violation of Article 3, Section 3, with copies to the President of the Building Trades Council, and the offending subcontractor

(2) The arbitration award establishes that the Contractor had knowledge of the violation of Article 2, Section 3.

D. The Project Contractor and Owner shall be notified of all actions at Steps 2 and 3 and shall, upon their request, be permitted to participate in all proceedings at these steps.

ARTICLE 10 - JURISDICTIONAL DISPUTES

A. The assignment of work will be solely the responsibility of the Contractor performing the work involved; and such work assignments will be in accordance with the Plan

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for the Settlement of Jurisdictional Disputes in the Construction Industry (the "Plan") or any successor Plan.

B. All jurisdictional disputes on this project, between or among Building and Construction Trades Unions and employers, parties to this Agreement, shall be settled and adjusted according to the present Plan established by the Building and Construction Trades Department or any other plan or method of procedure that may be adopted in the future by the Building and Construction Trades Department. Decisions rendered shall be final, binding and conclusive on the Contractors and Unions parties to this Agreement.

C. All jurisdictional disputes shall be resolved without the occurrence of any strike, work stoppage, or slow-down of any nature and the Contractor's assignment shall be adhered to until the dispute is resolved. Individuals violating this section shall be subject to immediate discharge.

D. Each Contractor will conduct a pre job conference with the Council prior to commencing work. The CM and the Owner will be advised in advance of all such conference and may participate if they wish.

E. Jurisdictional Dispute grievances shall not be brought directly against the CM, except as they may relate to its role as a Contractor on the Project

F This jurisdictional Dispute Resolution will only apply to Project Work performed by Local Unions at the Project Site.

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ARTICLE 11- WAGES AND BENEFITS

SECTION 1. CLASSIFICATION AND BASE HOURLY RATE

A. All employees covered by this Agreement shall be classified in accordance with the work performed and paid the higher of (i) the base hourly wage rates for those classifications as specified in the Exhibit B CBAs, as amended during this Agreement, or Recognizing, however, that special conditions may exist or occur on the Project, the parties, by mutual agreement in writing may establish rates and/or hours for one or more classifications which may differ from the rates stated in Exhibit B CBAs. Parties to such agreements shall be the CM, the Contractor involved, the involved Local Unions and the Council.

SECTION 2. EMPLOYEE BENEFIT FUNDS

A. The Contractor and sub-contractors agree to pay contributions on behalf of all employees covered by this Agreement to the established employee benefit funds in the amounts designated in the appropriate Exhibit B CBAs. Bona fide jointly trusted fringe benefit plans established or negotiated through collective bargaining during the life of this Agreement may be added.

B. The Contractor and sub-contractors agree to be bound by the written terms of the legally established Trust Agreements specifying the detailed basis on which payments are to be paid into, and benefits paid out of such Trust Funds but only with regard to Project Work done under this Agreement and only for those employees to whom this Agreement requires such benefit payments. Any Contractor performing Project Work that is not a signatory to an Exhibit B CBA, will be required to sign and file with the CM, with a copy to the appropriate Local Union, an "Affidavit of Compliance with the PLA" in the form described as Exhibit F hereto so that such Affidavit may be filed with the Local Union and its related Trust Funds.

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C. The CM, the Contractor and sub-contractor, as applicable, in order to ensure the full and timely remittance of all union dues, IAF, PAC, and fringe benefit funds, including but not limited to Health and Welfare, Pension, Annuity, Legal Service, Education and Training, S.U.B., Apprenticeship (hereafter "Funds" or "Fund") due the affiliated Local Union Benefit Funds and the Labor Management Alliance as provided for in all Exhibit B CBA's or this PLA between the Local Unions and signatory employers and/or a supplier which has contracted to deliver construction materials to the Project using members of Teamsters Local 456 ("Supplier") agrees that it will, upon notification given to the CM or Contractor as applicable, from any affiliated Local Union or the Building Traced Council of not more than twenty-one (21) days from the date when the Union knew or should have known signatory Contractor, sub-contractor or Supplier, as applicable, has become delinquent in the payment of Fund contributions ("21-Day Notice") due in connection with the work on this Project, or the delivery of construction materials to the Project ("Delinquent Employer"), (i) immediately stop payment on all monies due or which may become due to the delinquent signatory employer or supplier up to the amount alleged to be owed from this Project and (ii) pay all such funds directly to the complaining Local Union Benefit Funds, which shall apply the funds against the amounts owed by the Delinquent Employer or Supplier. The 21-Day Notice to be effective shall include at a minimum a detailed breakdown of the delinquency amount, how it was calculated, the relevant dates, names of employees, the hours at issue, and the relevant job steward reports. Before such payment is made, the CM, the Contractor or sub-contractor, as applicable, shall first advise the delinquent Employer or Supplier, in writing of the complaint made by the Local Union and the amounts claimed ("10-Day Notice Letter") and shall allow the Delinquent Employer or Supplier a period of ten (10) days from the date of notification to produce a written letter signed by the Business Manager of the complaining Local Union that the delinquent amount has been paid in full and

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the Delinquent Employer or Supplier is current in the remittance of contributions to the complaining affiliate's Benefit Funds ("Payment in Full Letter") or a bona-fide explanation acceptable to the complaining Local Union of why in the signatory Delinquent Employer's or the Supplier's opinion the amounts are not due as alleged or the matter has been otherwise resolved. In the event of such a bona-fide dispute the CM, the Contractor or sub-contractor will use its best effort to act as an initial arbiter and take action it then deems appropriate.

(1) No monies shall be paid to a Delinquent Employer or Supplier who may request arbitration of the dispute in accordance with the expedited arbitration procedure in Article 7, Section 4 herein. Article 9 herein. There will be no strike, work stoppage or disruption pending resolution of the dispute.

(2) In the event such a Payment in Full Letter is not produced by the Delinquent Employer or Supplier within ten (10) days from the date of notification to the delinquent signatory employer or supplier, the CM, the Contractor or subcontractor shall immediately pay over to the Fund Administrator of the complaining Local Union all monies due and owing to the Delinquent Employer or Supplier, but only to the extent necessary to satisfy the amounts payable to the Delinquent Employer or Supplier by the Contractor or subcontractor for work performed or construction materials delivered to the Project. None of the foregoing is to be construed as having created a debt on the part of the CM, the Contractor to the Local Union Benefit Funds for unpaid Funds of the signatory Delinquent Employer or Supplier except to the extent that (a) there are funds payable to the signatory Delinquent Employer or Supplier (b) Benefit Fund contributions are overdue to the Local Unions for work by the signatory Delinquent Employer or for construction materials delivered by the Supplier for work on this Project and with proper

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notice as herein provided, and (c) the CM, the Contractor or the sub-contractor received a timely 21-Day Notice, and (d) the CM, the Contractor, as applicable, paid the unpaid Funds to the Delinquent Employer.

(3) There will be no strike, work stoppage or disruption pending resolution of the dispute. Notwithstanding any other provisions of this Agreement, including any provisions to arbitrate disputes, the members of a Local Union *shall* elect to refuse to perform services for only the Delinquent Employer or Supplier provided that all of the following conditions are first met: *first*, a Benefit Fund delinquency relates to Project Work and exceeds thirty (30) days; *second*, the Local Union provides five (5) days' written notice to the President of the Building Trades Council, the CM, and the Contractor, the subcontractor, as applicable, and the Delinquent Employer; *third*, the Local Union exhausts the expedited arbitration procedure in Article 7, Section 4 above; *fourth*, an arbitrator issues an award in favor of the Local Union and/or its Funds and against the Delinquent Employer; *fifth*, the Delinquent Employer does not file an action in a court of competent jurisdiction to overturn the arbitration award within 30 days of issuance of the award; but if the Delinquent Employer files a timely action in a court of competent jurisdiction to overturn the award, then *sixth*, the court declines for any reason to overturn the arbitration award. The provisions of Article 7, Section 1 shall remain in full force and effect with respect to all other Local Union members working on the Project. However, if the work of the complaining Local Union is being performed by employees represented by a Union that is not an affiliate of this Council or by non-union employees, the provisions of Article 7, Section 1 will not apply. If a signatory employer's or supplier's inability to collect payment from the Owner and/or Developer for work

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performed on the Project, or for construction materials delivered to the Project, the Contractor agrees that the signatory employer or supplier will not be removed from the job for non-performance which results from a Local Union's members refusing to perform services as set forth in this Section.

(4) The CM hereby designates _____ as the person to contact should there be any delinquent Benefit Fund Contributions for Project Work performed by members of a Local Union that is signatory to this Agreement.

D. At least two weeks before the CM or the Contractor makes final payment to a sub-contractor upon completion of the job, the CM or the Contractor, as applicable, shall make a written inquiry to the sub-contractor's Local Union to determine if all Benefit Fund payments have been made. If the sub-contractor is delinquent in the payment of Benefit Fund contributions due in connection with work on this Project, or for the delivery of construction materials to the Project, the Contractor shall adhere to the procedure in Section 2, Paragraphs (C)-(E) of this Article. The 21-Day Notice Requirement set forth in Section 2, Paragraph (C) shall be reduced to a 5 calendar day notice requirement but in all other respects shall remain applicable.

ARTICLE 12 - HOURS OF WORK, PREMIUM PAYMENTS SHIFTS AND HOLIDAYS

SECTION 1. WORK WEEK AND WORK DAY

A. The standard work week shall consist of 40 hours of work, Monday through Friday, eight hours per day, at straight time rates per the following schedule: Monday-Friday; 5 days, 8 hours plus 1/2 hour unpaid lunch period each day.

B. The first or day shift shall work eight (8) hours starting at 8:00 a.m. and ending at

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4:30pm (or 7:00a.m. and ending at 3:30p.m.), this includes a 1/2 hour lunch break.

C. If a second shift is required, the second shift shall work eight (8) hours starting at 4:00p.m. and ending at 12:30 a.m. This includes a 1/2 hour lunch period in between to be mutually agreed on.

D. If a third shift is required, the third shift shall work eight (8) hours starting at 12:00 midnight and ending at 8:30 a.m. This includes a 1/2 hour lunch period in between to be mutually agreed on.

E. Notice -- Contractors shall provide not less than 5 days' prior notice to the Local Union involved as to the work week and work hour schedules to be worked or such lesser notice as may be mutually agreed upon.

SECTION 2. OVERTIME

Overtime at the rate of time and one-half the straight time wage for all employees covered by this Agreement shall be paid for the following:

- A. Work outside of the standard starting and finishing time.
- B. Work in excess of eight (8) hours per day; and
- C. Work on Saturday.

There will be no restriction upon the CM, the Contractor's or the sub-contractor's scheduling of overtime or the designation of employees who shall be worked. There shall be no pyramiding of overtime pay under any circumstances. The CM, the Contractor or sub-contractor shall have the right to schedule work so as to minimize overtime, and the right to schedule overtime as to some, but not all of the crafts, and to determine whether overtime shall be of a continuous nature.

SECTION 3. SHIFT WORK

- A. Flexible Schedules-In accordance with Project Work.

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The CM and the Contractors shall have the right to modify all shift start and end times and add or delete shifts subject *first* to obtaining a written notice from Owner request modification of the start and end times for one of more shifts and/or the number of shifts, and *second*, providing five days' notice and a copy of the Owner's notice to the affected Local Unions. Shifts must be worked a minimum of five consecutive work days, must have prior approval of the CM, and must be scheduled with not less than five work days' notice to the Local Union. Saturday and Sunday, if worked, can be used for establishing the 5 day minimum shift work period, however, those days will be paid at their respective overtime rates. The straight time workweek shall be considered to start with the day shift on Monday and end with the conclusion of the second or third shift on the fifth day. The shift that begins approximately midnight Sunday night shall be considered the last shift of the Sunday workday. In the event the second or third shift of any regular workweek shall extend into a holiday, employees will be paid the regular shift rate. Should the Contractor or sub-contractor choose to work at 7:00am.through 3:30pm as the first shift, the second shift will work eight (8) consecutive hours following the first shift with one-half hour break in each case.

B. Second Shift - If a second or third shift is required, then the shift premium for the second or third shift shall be ten (10%) percent

C. Shift work relating to structural steel erection is subject to a mutual agreement between Iron Workers Local 40 and the CM, the Contractor or sub-contractor, due to the potential hazardous situations which could exist.

D. A first shift need not be worked in order to work a second or third shift.

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SECTION 4. SATURDAY MAKE UP DAY

When conditions beyond the control of the Contractor, such as severe weather, power failure, fire or natural disaster, prevent the performance of Project Work on a regularly scheduled work day, the Contractor may, with mutual agreement of the Local Union, schedule Saturday during that calendar week in which a workday was lost, as a make-up work day at straight time rates, where New York Labor Law Section 220 and the Prevailing Wage Schedule for Westchester County permit this; providing the employees involved work a total of 40 hours or less during that work week. Any work after eight hours on a Saturday make-up day shall be at time and one half. If the make-up day results in an employee to be entitled to more than forty (40) hours pay for the week, the additional time shall be at time and one half. The crew of employees on a make-up day shall not exceed the average crew size employed during the week.

At the Employer's discretion, Saturdays can be substituted as a make-up day at the straight time rate of pay as the result of inclement weather which causes a cessation of work during the work week. If a Local Agreement provides for Shape-Up, there must be a Shape-Up Day during the week.

Any work after eight hours on a Saturday make-up day shall be at time and one half. If the make-up day results in an employee to be entitled to more than forty (40) hours pay for the week, the additional time shall be at time and one half. The crew of employees on a make-up day shall not exceed the average crew size employed during the week.

Four (4) day, ten (10) hour work week; Monday-Thursday at straight time may be established by the employer. Friday or Saturday can be substituted as a make-up day at the straight time rate of pay as a result of inclement weather which causes a cessation of work during the work week provided there has been a shape-up day during the work week.

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Any work performed over ten (10) hours in any one day or forty (40) hours in any one week, which includes any make-up day, shall be paid for at the rate of time and one-half (1-1/2). The crew of employees on a make-up day shall not exceed the average crew size employed during the week, the contractor must notify the union in writing at least three business days in advance of scheduling a four (4) day, ten (10) hour work week.

SECTION 5. HOLIDAYS

A. Schedule - There shall be only the following 8 recognized holidays on the Project:

New Year's Day	Labor Day
Presidents Day	Veterans Day
Memorial Day	Thanksgiving Day
Fourth of July	Christmas Day

All said holidays shall be observed on the dates designated by New York State Law. In the absence of such designation, they shall be observed on the calendar date, except those holidays which occur on Saturday shall be observed on the preceding Friday and those which occur on Sunday shall be observed on the following Monday.

B. Payment- Regular holiday pay, if any, and/or premium pay for work performed on such a recognized holiday shall be in accordance with the applicable Exhibit B CBA

C. Exclusivity - No holidays other than those listed in Section 5(A) above shall be recognized or observed on the Project.

SECTION 6. REPORTING PAY

A. Employees who report to the work location pursuant to a regular schedule and who are not provided with work or whose work is terminated early by a Contractor or subcontractor, for whatever reason, shall receive minimum reporting pay in accordance with the

PROJECT LABOR AGREEMENT

applicable Exhibit B CBA, except that no reporting pay shall be required for lost days due to severe weather conditions that cause the Project to shut down or makes performing certain work unsafe, power outage, fire, natural disaster, Presidential or Vice Presidential visits, or Homeland Security directives provided employees are called at least three hours ahead of their scheduled shift start (email notification shall also be sent to the Local Unions involved).

B. When an employee, who has completed his scheduled shift and left the Project Site, is "called out" to perform special work of a casual, incidental or irregular nature, the employee shall receive pay for actual hours worked with a minimum guarantee, as may be required by the applicable Exhibit B CBA, at the employee's straight time rate.

C. When an employee leaves the job or work location of his own volition or is discharged for cause or is not working as a result of the Contractor or sub-contractor's invocation of Section 7 below, he shall be paid only for the actual time worked.

D. Except as specifically set forth in this Article, there shall be no premiums, bonuses, hazardous duty, high time or other special payments of any kind.

E. There shall be no pay for time not actually worked except as specifically set forth in this Article and except where an applicable Exhibit B CBA requires a full week's pay for foreperson

SECTION 7. PAYMENT OF WAGES

Payday - Payment shall be made by check, drawn on a New York bank with branches located within commuting distance of the job site. Paychecks shall be issued by the Contractor or sub-contractor at the job site by 10 a.m. on Thursdays. In the event that the following Friday is a bank holiday, paychecks shall be issued on Wednesday of that week. Not more than 3 days

PROJECT LABOR AGREEMENT

wages shall be held back in any pay period. Paycheck stubs shall contain the name and business address of the Contractor or sub-contractor, together with an itemization of deductions from gross wages.

Termination- Employees who are laid off or discharged for cause shall be paid in full for that which is due them at the time of termination. The Contractor or subcontractor shall also provide the employee with a written statement setting forth the date of layoff or discharge.

SECTION 8. EMERGENCY WORK SUSPENSION

The Contractor or sub-contractor may, if considered necessary for the protection of life and/or safety of employees or others, suspend all or a portion of Project work. In such instances employees will be paid for actual time worked; provided, however, that when the Contractor or sub-contractor requests that employees remain at the job site available for work, employees will be paid for "stand-by" time at their hourly rate of pay.

SECTION 9. INJURY/DISABILITY

An employee, who, after commencing work, suffers a work-related injury or disability while performing work duties, shall receive no less than 8 hours wages for that day. Further, the employee shall be rehired at such time as he is able to return to his duties provided there is still work available on the Project for which he is qualified and able to perform.

SECTION 10. TIME KEEPING

The Contractor or sub-contractor may utilize brassing or other systems to check employees in and out. Each employee must check in and out. The Contractor or sub-contractor will provide adequate facilities for checking in and out in an expeditious manner.

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SECTION 11. MEAL PERIOD

The Contractor or sub-contractor shall schedule an unpaid period of not more than 1/2 hour duration at the work location between the 3rd and 5th hour of the scheduled shift. A Contractor or sub-contractor may, for efficiency of operation, establish a schedule which coordinates the meal periods of two or more crafts. If an employee is required to work through the meal period, he shall be compensated in a manner established in the applicable Exhibit B CBA.

SECTION 12 BREAK PERIODS

There will be no rest periods, organized coffee breaks, or other non-working time established during working hours, with the exception of reasonable coffee and/or soda breaks to be determined by the Contractor or sub-contractor. Individual coffee containers will be permitted at the employee's work location.

ARTICLE 13 - APPRENTICES

SECTION 1. RATIOS

Recognizing the need to maintain continuing supportive programs designed to develop adequate numbers of competent workers in the construction industry and to provide craft entry opportunities for minorities and women, the Contractor and sub-contractor will employ apprentices in their respective crafts to perform such work as is within their capabilities and which is customarily performed by the craft in which they are indentured. The Contractor and sub-contractor may utilize apprentices with the approval of the affected affiliate or affiliates to the highest ratio filed with New York State Department of Labor.

SECTION 2. MINORITIES, WOMEN, HELMETS TO HARDHATS

A. The Unions agree to work in close cooperation with, and accept monitoring by, the New York State Department of Labor to ensure that minorities and women are afforded every opportunity to participate in apprenticeship programs which result in the placement of

PROJECT LABOR AGREEMENT

apprentices on this Project. To further ensure that this goal is achieved, the Contractors and the Unions agree that minority or women apprentices or recognized trainees may be used on the Project in accordance with the requirements of the Project bid documents.

B. **Helmets to Hardhats.** The CM and the unions recognize a desire to facilitate the entry into the building and construction trades of veterans who are interested in careers in building and construction industry. The CM and unions agree to utilize the services of the Center for Military Recruitment, Assessment and Veterans Employment (hereinafter "Center") and the Center's "Helmets to Hardhats" program to serve as a resource for preliminary orientation, assessment of construction aptitude, referral to apprenticeship programs or hiring halls, counseling and mentoring, support network, employment opportunities and other needs as identified by the parties.

(1) The Unions and the CM agree to coordinate with the Center to create and maintain an integrated database of veterans interested in working on this Project and of apprenticeship and employment opportunities for this Project. To the extent permitted by law, the Unions will give credit to such veterans for bona fide, provable past experience.

ARTICLE 14- SAFETY PROTECTION OF PERSON AND PROPERTY

SECTION 1. SAFETY REQUIREMENTS

The Contractors, the Council and the Local Unions acknowledge that the CM has submitted to the Owner, and the Owner has approved, a Safety Program for the Project and that the CM will monitor and measure compliance by the Contractors and their employees and workers with the Safety Program, report deficiencies and direct remedial action. The Safety

PROJECT LABOR AGREEMENT

program is more fully described in Exhibit D hereto, except that the provisions of the Substance Abuse Prevention and Firearms Prohibition Policy, which is summarized in Section 4 below and is described at Exhibit D hereto, shall supersede any contrary provisions of the Safety program. The Contractor and sub-contractor will ensure that applicable OSHA requirements are at all times maintained and enforced on the Project and the employees and Unions agree to cooperate fully with these efforts. Employees must perform their work at all times in a safe manner and protect themselves and the property of the Contractor from injury or harm. Failure to do so will be grounds for discipline, including discharge.

SECTION 2. CONTRACTOR RULES

Employees covered by this Agreement shall at all times be bound by the reasonable safety, security, and visitor rules as established by the CM, the Contractor and sub-contractor for this Project, including the CM's Exhibit D Safety program. Such other CM and Contractor rules will be published and posted in conspicuous places throughout the Project Site. Every employee who disregards or violates any safety, security, or visitor rules will be subject to discharge.

SECTION 3. INSPECTIONS

The CM, the Contractors and the sub-contractors retain the right to inspect incoming shipments of equipment, apparatus, machinery and construction materials of every kind.

ARTICLE 15- NO DISCRIMINATION

SECTION 1. COOPERATIVE EFFORTS

The Contractor, sub-contractor and Unions agree that they will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation,

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national origin, military status, predisposing genetic characteristics, age or marital status in any manner prohibited by law or regulation. It is recognized that special procedures may be established by the CM, the Contractor and sub-contractors and Local Unions and the New York State Department of Labor for the training and employment of persons who have not previously qualified to be employed on construction projects of the type covered by this Agreement. The parties to this Agreement will assist in such programs and agree to use their best efforts to ensure that the goals for female and minority employment if any are met on this Project.

SECTION 2. LANGUAGE OF AGREEMENT

The use of the masculine or feminine gender in this Agreement shall be construed as including both genders.

ARTICLE 16 - GENERAL TERMS

SECTION 1. PROJECT RULES

The CM, the Contractors and the sub-contractors shall establish such reasonable Project rules as are appropriate for the good order of the Project, including but not limited to rules relating to health and safety, access, smoking, and alcohol and drug use, and a comprehensive security, badging and access system to control worker access to the Project Site. These rules will be explained at the pre-job conference and posted at the Project Site and may be amended thereafter as necessary. Failure of an employee to observe these rules and regulations shall be grounds for discipline, including discharge. The fact that no order was posted prohibiting a certain type of misconduct shall not be a defense to an employee disciplined or discharged for such misconduct when the action taken is for cause.

- A. No smoking will be permitted on or adjacent to the Project Site.

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B. No alcohol or illegal drug use on or adjacent to the Project Site.

C. Personal protective equipment (PPE) such as hardhats, safety vests, eye protection, work boots, gloves, and any other equipment for a specific task shall be worn on the Project Site at all times.

D. Proof of successfully completing the OSHA 10 hours safety training course within the last 5 years prior to working on project site.

SECTION 2. TOOLS OF THE TRADE

The welding/cutting torch and chain fall are tools of the trade having jurisdiction over the work performed. Employees using these tools shall perform any of the work of the trade. There shall be no restrictions on the emergency use of any tools or equipment by any qualified employee or on the use of any tools or equipment for the performance of work within the employee's jurisdiction

SECTION 3. SUPERVISION

Employees shall work under the supervision of the craft foreperson or general foreperson

SECTION 4. TRAVEL ALLOWANCES

There shall be no payments for travel expenses, travel time, subsistence allowance or other such reimbursements or special pay except as expressly set forth in this Agreement

SECTION 5. FULL WORKDAY

Starting and quitting times shall occur at the staging areas as may be designated by the CM, with the understanding that on any single day, the staging area will be the same location as the employee's starting time and quitting time. On-site parking will be provided. The signatories reaffirm their policy of a fair day's work for a fair day's wage.

SECTION 6. COOPERATION AND WAIVER

PROJECT LABOR AGREEMENT

The Council, on its own behalf and on behalf of its affiliated Local Unions and their individual members, intend the provisions of this Agreement to control to the greatest extent permitted by law, notwithstanding any contrary provisions of any applicable prevailing wage, or other, law, and intend this Agreement to constitute an unequivocal, knowing and express waiver of the application to Project Work within the scope of this Agreement of any such prevailing wage law to the fullest extent permissible under the law, including specifically, but not limited to, provisions relating to shift, night, and similar differentials and premiums, holidays and holiday pay, and pay for hours not worked. The parties agree that the terms and conditions of this Agreement are prevailing in their industry and are consistent with the terms and conditions of employment that the Local Unions and their members have traditionally enjoyed in Westchester County

To the extent the provisions of this Agreement differ from the requirements of the applicable prevailing wage law, or any other law, the Unions, on their own behalf and on behalf of the individual employees they represent, intend the provisions of this Agreement to control to the maximum extent permitted by law.

ARTICLE 17 - SAVINGS AND SEPARABILITY

SECTION 1. THIS AGREEMENT

In the event that the application of any provision of this Agreement is enjoined, on either an interlocutory or permanent basis, or otherwise found in violation of law, or if such application may cause the loss of Project funding for all or any part of the Project, the provision involved (and/or its application to a particular part of the Project, as necessary) shall

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be rendered, temporarily or permanently, null and void, but where practicable the remainder of the Agreement shall remain in full force and effect to the extent allowed by law, unless the part or parts so found to be in violation of law are wholly inseparable from remaining provisions of the Agreement and/or are material to the purposes of the Agreement. In the event a court of competent jurisdiction finds any portion of the Agreement to be invalid, the parties to this Agreement will immediately enter into negotiations concerning the substance affected by such decision for the purpose of achieving conformity with the court determination and the intent of the parties hereto for contracts to be let in the future.

SECTION 2. THE BID SPECIFICATIONS

In the event that the Owner's bid specifications, or other action, requiring that a successful bidder become signatory to this Agreement is enjoined, on either an interlocutory or permanent basis, or otherwise found in violation of law, or may cause the loss of funding for all or any part of the Project, such requirement (and/or its application to a particular part of the Project, as necessary) shall be rendered, temporarily or permanently, null and void, but where practicable the Agreement shall remain in full force and effect to the extent allowed by law. In such event, the Agreement shall remain in effect for contracts already bid and awarded or in construction where the Contractor or sub-contractor voluntarily accepts the Agreement. The parties will enter into negotiations as to modifications to the Agreement to reflect the court action taken and the intent of the parties for contracts to be let in the future

SECTION 3. NON-LIABILITY

In the event of an occurrence referenced in Section 1 or Section 2 of this Article, neither the CM, the Contractor, any sub-contractor, nor any signatory Union shall be liable, directly or indirectly, for any action taken, or not taken, to comply with any court order, injunction or determination. Project bid specifications will be issued in conformance with court orders then

PROJECT LABOR AGREEMENT

in effect and no retroactive payments or other action will be required if the original court determination is ultimately reversed.

SECTION 4. NON-WAIVER

Nothing in this Article shall be construed as waiving the prohibitions of Article 7 as to signatory Contractors, sub-contractors and signatory Unions.

ARTICLE 18 - FUTURE CHANGES TO COLLECTIVE BARGAINING AGREEMENTS

SECTION 1. CHANGES TO AREA CONTRACTS

Exhibit B CBA's shall continue in full force and effect until the Contractor, the sub-contractor and/or Union parties to the Area Collective Bargaining Agreements which are the basis for Exhibit B CBA's notify the CM in writing of the mutually agreed upon changes in provision of such agreements which are applicable to the Project, and their effective dates. It is agreed that any provisions negotiated into the Exhibit B CBA's will not apply to work on this Project if such provisions are less favorable to this Project than those uniformly required of Contractors for construction work normally covered by those agreements; nor shall any provision be recognized or applied on this Project if it may be construed to apply exclusively, or predominantly, to work covered by this Project Agreement.

Any disagreement between signatories to this Agreement over the incorporation into the Exhibit B CBA's of provisions agreed upon in the renegotiation of Area Collective Bargaining Agreements shall be resolved in accordance with the procedure set forth in Article 9 of this Agreement.

SECTION 2. LABOR DISPUTES DURING AREA CONTRACT NEGOTIATIONS

The Unions agree that there will be no strikes, sympathy strikes, parades, bannerings, establishment of an inflatable rat or any similar display or signal, work stoppages, sympathy

PROJECT LABOR AGREEMENT

actions, picketing, hand billing, slowdowns or other disruptive activity or other violations of Article 7 affecting the Project by any Local Union involved in the renegotiation of Area Local Collective Bargaining Agreements, nor shall there be any lock-out on this Project affecting a Local Union during the course of such renegotiations.

ARTICLE 19 - WORKERS' COMPENSATION ADR

At the written option of the Contractor and with the written approval of the Building and Construction Trades Council of Westchester and Putnam Counties, New York, all Local Unions, Contractors and Sub-Contractors working on this project agree to be bound by the Collectively Bargained Workers Compensation Alternative Dispute Resolution Agreement [ADR Agreement] and to the ADR program set forth therein, by and between the Construction Industry Council of Westchester and the Hudson Valley, Inc. and the Building and Construction Trades Council of Westchester and Putnam Counties, New York, entered into on January 26, 2007, as amended.

ARTICLE 20 - DRUG FREE WORK PLACE; FIREARMS PROHIBITION

This Project Site is a Drug-Free Workplace. The use, consumption, sale, transfer, purchase and/or possession of a controlled substance, alcohol and/or firearms during working hours or while on the Project Site, and reporting for work under the influence of a controlled substance or alcohol are prohibited. The CM's substance abuse and firearms prohibition policy will apply to all individuals performing work on the Project Site and is attached as Exhibit D, and the CM will arrange for testing of employees of the Contractor or the

PROJECT LABOR AGREEMENT

Subcontractor in question through Clarity Testing Services at the Contractor's or Subcontractor's expense.

ARTICLE 21 - LABOR MANAGEMENT ALLIANCE

SECTION 1. LABOR MANAGEMENT ALLIANCE (LMA)

A. The Contractor and all Subcontractors performing Project Work agree to be bound by the provisions of the Westchester Mid-Hudson Labor Management Alliance (LMA), which is incorporated by reference in its entirety into this Agreement and to contribute 5 cents (\$0.05) per hour for each hour worked by members of an affiliate on the Project. The Contractor agrees to provide the LMA with a quarterly report of the names, addresses and contact information of the Subcontractors working on the project.

B. The Contractor agrees to withhold payments for any monies due to a Subcontractor who is delinquent in contributions to the LMA upon receipt of a Twenty One (21) day notice which was sent to the Subcontractor with notice of the delinquency and that the Contractor will be instructed to withhold payment of all monies due to the delinquent Subcontractor until the necessary contributions are made to the LMA.

ARTICLE 22 - MISCELLANEOUS

SECTION 1. NOTICES

Any notice, request, demand, instruction, or other document to be given or served will be in writing and will be delivered personally with a receipt requested thereof or by fax or e-mail or sent by Federal Express at the respective addresses set forth below To the CM, unless otherwise agreed to in writing, the terms and conditions of the Exhibit B CBA's, except as modified by this PLA, shall remain in full force and effect.

PROJECT LABOR AGREEMENT

SECTION 2. AMENDMENTS

Amendments to this Agreement, which may be required for operational efficiency or implementation consistency, may be established by mutual agreement of the parties to this Agreement.

SECTION 3. GOVERNING LAW

This Agreement will be governed by the laws of the United States and of the State of New York.

SECTION 4. DURATION OF AGREEMENT

This Agreement will remain in effect until no later than 60 calendar days after the CM substantially completes the demolition, building core and shell, and construction of the building interior and Tenant spaces which are to be occupied immediately by the Owner. The CM shall provide written notice to the Council that the Project Work is substantially complete in accordance with Article 22, Section 1, and the Agreement shall remain in effect until the end of the 60th calendar day following the date of notice. Notwithstanding the foregoing sentence, the Council and the Local Unions shall make no Claim to stand-by work to be performed in any part of the Project Site, or any facility, system or space, that the Owner has accepted, used, or occupied, regardless of whether the facility, system or space is used to support the construction, renovation or demolition work that has been awarded to the CM.

SECTION 5. COUNTERPARTS

This Agreement may be executed by facsimile or PDF and/or in one or more counterparts, and by the parties and Local Union signatories hereto in separate counterparts,

PROJECT LABOR AGREEMENT

each of which when executed shall be deemed to be an original but all of which taken together shall constitute one and the same Agreement.

IN WITNESS WHEREOF the parties have caused this Agreement to be executed.

CONSTRUCTION MANAGER

By: _____

DATE _____

(Name/Title)

BUILDING & CONSTRUCTION TRADES COUNCIL OF WESTCHESTER & PUTNAM
COUNTIES, New York, AFL-CIO on behalf of itself and the Local Unions listed in Exhibit "B"
attached

BY: _____

EDWARD DOYLE, SR., PRESIDENT

DATE _____

BY: _____

JEFF LOUGHLIN, VICE-PRESIDENT

DATE _____

BY: _____

DARIO BOCCAROSSA, SECRETARY-TREASURER

DATE _____

PROJECT LABOR AGREEMENT

EXHIBIT "A"

Project Labor Agreement - Letter of Assent

The undersigned party confirms that it agrees to be a party to and be bound by the Project Labor Agreement covering **UPGRADES TO THE SAW MILL PUMP STATION INCLUDING NEW PUMPING SYSTEMS, INFLUENT GRINDERS, PIPING MODIFICATIONS, CONTROL SYSTEM UPGRADES AND GENERAL BUILDING UPGRADES, ROOF REPLACEMENT, AND ELECTRICAL UPGRADES TO THE SAW MILL PUMP STATION INCLUDING A NEW BACK-UP PROPANE/NATURAL GAS GENERATOR AND SERVICE GEAR – VILLAGE/TOWN OF MOUNT KISCO** as such Agreement may, from time to time, be amended by the parties or interpreted pursuant to its terms. The terms of the Project Labor Agreement, its Schedules, Addenda and Exhibits are hereby incorporated as referenced herein.

Name of Contractor or Subcontractor: _____

Authorized Officer & Title: _____

Signature: _____ Date: _____

Address: _____

Phone: _____

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EXHIBIT "B"

CBA'S

BRICKLAYERS AND ALLIED CRAFT WORKERS LOCAL UNION 5

NORTHEAST REGIONAL COUNCIL OF CARPENTERS - LOCAL 279

INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS LOCAL #3

LABORERS INTERNATIONAL UNION OF NORTH AMERICA, LOCAL #235

INTERNATIONAL UNION OF OPERATING ENGINEERS, LOCAL #137

DISTRICT COUNCIL #9 INTERNATIONAL BROTHERHOOD OF PAINTERS AND
ALLIED TRADES AFL-CIO

PLUMBERS & STEAMFITTERS LOCAL 21

TEAMSTERS LOCAL #456

DOCKBUILDERS LOCAL UNION 1556

LOCAL UNION #40 OF THE INTERNATIONAL ASSOCIATION OF BRIDGE,
STRUCTURAL AND ORNAMENTAL IRON WORKERS

METALLIC LATHERS UNION LOCAL #46

INTERNATIONAL UNION OF OPERATING ENGINEERS, LOCAL #15D

TEAMSTERS LOCAL #813

TEAMSTERS LOCAL #814

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ASBESTOS WORKERS LOCAL #91 (INTERNATIONAL ASSOCIATION OF HEAT AND FROST INSULATORS AND ASBESTOS WORKERS)

GLAZIERS LOCAL 1087

BOILERMAKERS LOCAL #5

INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS LOCAL UNION 363

LOCAL ONE INTERNATIONAL UNION OF ELEVATOR CONSTRUCTORS OF NEW YORK AND NEW JERSEY (AFL-CIO)

IRON WORKERS DISTRICT COUNCIL OF GREATER NEW YORK ANVICINITY

ORNAMENTAL IRONWORKERS LOCAL UNION NO. 580

MILLWRIGHT AND MACHINERY ERECTORS LOCAL UNION NO. 740

IUOE LOCAL NO. 30 - OPERATING ENGINEERS

STONE DERRICKMEN AND RIGGERS LOCAL UNION NO. 197

ROAD SPRINKLER FITTERS LOCAL 669

UNITED UNION OF ROOFERS, WATERPROOFERS AND ALLIED WORKERS, LOCAL NO. 8, NEW YORK

SHEET METAL WORKERS' LOCAL UNION 38

BRIDGE PAINTERS LOCAL 806

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TILE, MARBLE & TERRAZZO BRICKLAYERS & ALLIED CRAFTSMEN LOCAL UNION
NO. 7 OF NEW YORK & NEW JERSEY

OPERATIVE PLASTERERS' AND CEMENT MASONS' INTERNATIONAL ASSOCIATION
LOCAL 262

UNITED CEMENT MASONS' UNION OF GREATER NEW YORK AND LONG ISLAND
LOCAL 780

HEAVY CONSTRUCTION LABORERS LOCAL 60

RESILIENT FLOOR COVERERS LOCAL 2287

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EXHIBIT "C"

PROJECT SITE AND PROJECT WORK

Description to follow

Exhibit E

Roof Inspection Report

The Garland Company, Inc.

Roof Asset Management Program

RAMP®



Garland RAMP Report: Mt. Kisco

Prepared By
John Lesko

Prepared For
Robert Flores

May 25, 2021

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Facility Summary

Client: Delaware Engineering

Facility: Mt Kisco NY WWTP



Facility Data

Address 1	400 Lexington Ave
City	Mt. Kisco
State	-
ZIP	10549
Type of Facility	Municipal
Square Footage	3,000
Contact Person	Robert Flores

Asset Information

Name	Date Installed	Square Footage	Roof Access
Lower Roof Section	2000's	1,500	Internal Roof Hatch
Upper Roof Section	2000's	1,500	Attached Ladder





Construction Details

Client: Delaware Engineering

Facility: Mt Kisco NY WWTP

Roof Section: Lower Roof Section

Information

Year Installed	2000's	Square Footage	1,500
Slope Dimension	1/4"	Eave Height	20'
Roof Access	Internal Roof Hatch	System Type	EPDM

Assembly

Roof #	Layer Type	Description	Attachment	R-Value	Thickness
1	Deck	Concrete	Poured - in - place	-	-
1	Insulation	Polyisocyanurate	Adhesive	-	2 1/4"
1	Membrane	EPDM	Adhesive	-	.060

Details

Perimeter Detail	Drip Edge
Flashing Material	EPDM

Inventory

Inventory Type	Quantity
Exhaust Fan	1
Soil Stack	1
Roof Hatch	1



Inspection Report

Client: Delaware Engineering

Facility: Mt Kisco NY WWTP

Report Date: 05/24/2021

Roof Section: Lower Roof Section

Inspection Information

Inspection Date	05/24/2021	Core Data	Yes
Inspection Type	Visual Inspection	Leakage	Yes
Deck Conditions	Good		

Flashing Conditions

Perimeter	Poor	Wall	Poor
Projections	N/A	Counterflashing	Poor

Miscellaneous Details

Reglets	Failed	Debris	No
Control Expansion Joints	Unknown	Ponding Water	Moderate
Parapet Wall	Fair	Coping Joints	N/A

Perimeter

Rating	Poor		
Condition	Metal edge is lifting in areas and the splice plates have been repaired multiple times. Metal on the north side of the building is dented and cracked along with a large dip in the roof surface, which looks like physical damage that has been repaired either from trees or machinery.		

Field

Rating	Fair		
Condition	Field of the roof is in fair condition, although there is evidence of membrane breakdown and ponding water, along with organic growth.		

Penetrations

Rating	Fair
Condition	Considering their age, the penetration details are in fair condition.

Drainage

Rating	Fair
Condition	There are no internal drains on the lower roof, and there is a downspout coming from the upper roof on either side that collects lots of water and has grown quite a bit of moss and mold. All water drains off the roof edge, but there is no gutter.

Overall

Rating	Poor
Condition	This roof is in poor condition, particularly around the wall flashings and edge. The insulation beneath seems to be in fair condition from the core cuts taken. This roof is in need of replacement.



Photo 1

Overall view of the roof surface. Aging EPDM with detail issues. Roof feels soft underfoot in many areas, indicating ongoing water penetration throughout the system.



Photo 2

View of the roof membrane and counterflashing. Sealant is failing above the reglet mounted flashing.



Photo 3

View of curb at rear roof edge.



Photo 4

View of the roof hatch providing access to the lower roof.



Photo 5

View of the downspout and drain outlet. It seems like the internal drains from above end up draining onto this roof and off the edge into the parking lot.



Photo 6

Metal cover over an air vent that should be replaced and waterproofed along with the new roof.



Photo 7

View of the single soil stack penetration.



Photo 8

External ladder providing access to the upper roof system.



Photo 9

Detail work that is dried and cracked, all along the rear edge of the building. It looks like the metal was used as a drip edge to prevent water from soaking the walls or entering the backside of the building.



Photo 10

Further view of the rear metal drip edge.



Photo 11

View of the metal exhaust fan and flashings.



Photo 12

View of the front side field and edge.



Photo 13

View of the front edge metal which has been repaired multiple times and is fairly loose.



Photo 14

Failed sealant above counterflashing is common around the entire perimeter.



Photo 15

Similar repairs have been attempted at the splice plates in the metal edge.



Photo 16

View of the north side roof surface.



Photo 17

The reglet mounted counterflashing has completely failed in many areas. Flashing height is also very low, it may be worth grinding out and raising the flashing for better waterproofing capability.

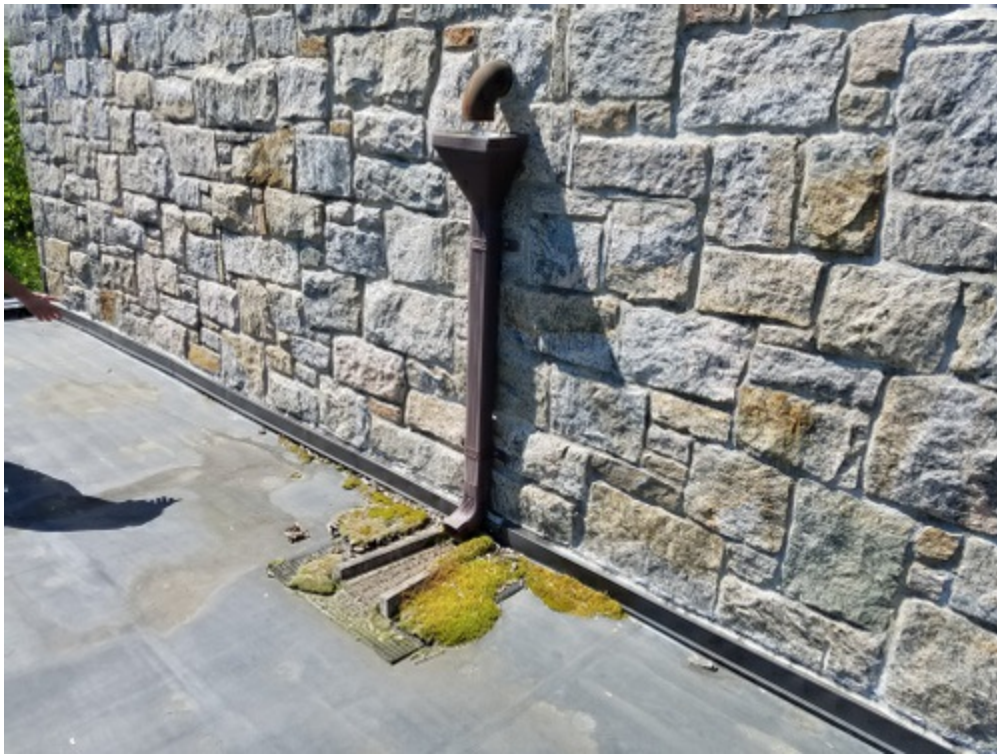


Photo 18

View of the drain from above coming into a downspout. There is a significant amount of moss and organic growth around the splash block which is holding moisture in that roof area.

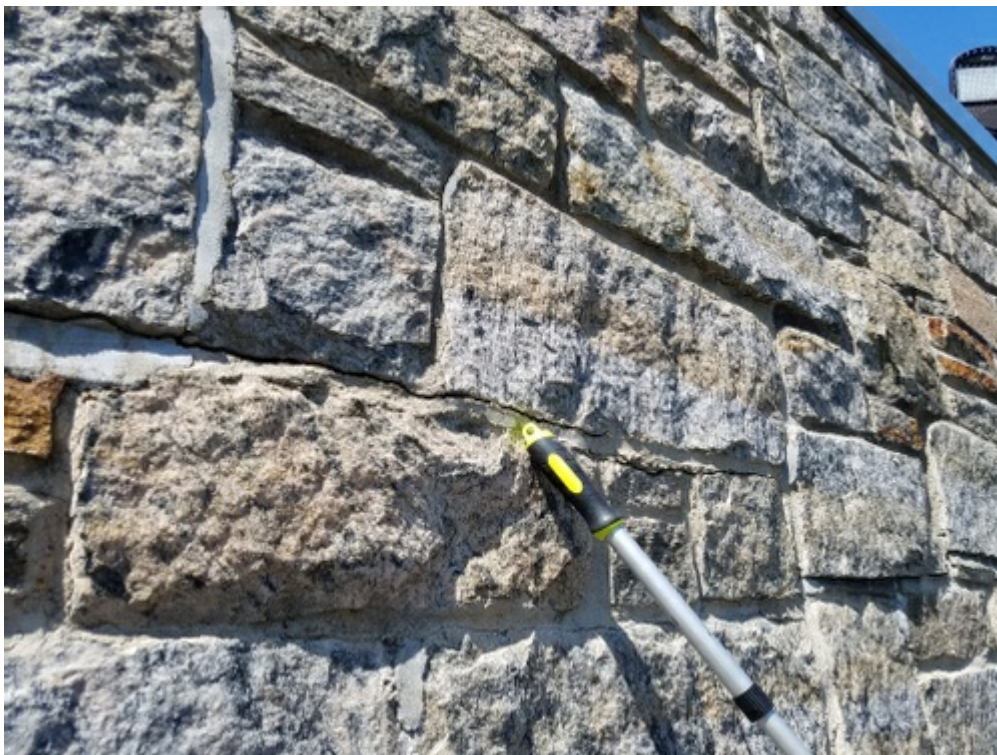


Photo 19

The masonry around this building has been sealed and repointed before, but it is still a major issue. Some of the joints are wide open for water penetration.



Photo 20

Close up of the masonry issues.



Photo 21

Connection detail on the rear edge of the building.



Photo 22

Wide open crack underneath one of the wall stones. This is allowing water and moisture into the building and needs repointing.



Photo 23

Lower roof core cut indicating 2 1/4" Polyisocyanurate insulation, with a fully adhered EPDM membrane and a concrete deck.



Photo 24

Lower roof core cut depth.



Photo 25

Repaired core cut.



Photo 26

Existing metal edge and fascia height is approx 14".



Construction Details

Client: Delaware Engineering

Facility: Mt Kisco NY WWTP

Roof Section: Upper Roof Section

Information

Year Installed	2000's	Square Footage	1,500
Slope Dimension	1/4"	Eave Height	30' +
Roof Access	Attached Ladder	System Type	EPDM

Assembly

Roof #	Layer Type	Description	Attachment	R-Value	Thickness
1	Deck	Concrete	Poured - in - place	-	-
1	Insulation	Polyisocyanurate - tapered	Adhesive	-	1" Base, 2" Tapered

Details

Perimeter Detail	Metal Edge
Flashing Material	EPDM
Drain System	Internal Roof Drains, Scuppers
Parapet Wall	Concrete Block

Inventory

Inventory Type	Quantity
Soil Stack	1
Drain	1



Inspection Report

Client: Delaware Engineering

Facility: Mt Kisco NY WWTP

Report Date: 05/25/2021

Roof Section: Upper Roof Section

Inspection Information

Inspection Date	05/25/2021	Core Data	Yes
Inspection Type	Visual Inspection	Leakage	No
Deck Conditions	Good		

Flashing Conditions

Perimeter	Good	Wall	Poor
Projections	N/A	Counterflashing	Fair

Miscellaneous Details

Reglets	N/A	Debris	No
Control Expansion Joints	Unknown	Ponding Water	Moderate
Parapet Wall	Good	Coping Joints	Fair

Perimeter

Rating	Fair
Condition	The perimeter edge is in fair condition, but a true coping cap would be a better solution.

Field

Rating	Good
Condition	The field membrane is in good condition, although there is moderate ponding water that should be addressed with crickets.

Penetrations

Rating	Good
Condition	There is only one penetration on this roof and it is in good shape.

Drainage

Rating	Fair
Condition	The drainage is fair. It seems like the internal drains actually drain out onto the lower roof system. There is one overflow scupper. Ponding water is of moderate concern on this roof.

Overall

Rating	Fair
Condition	Considering it's age, the membrane is in good shape. This may be a candidate for a liquid restoration rather than replacement. The drainage issue will need to be rectified.



Photo 1

Overall view of the upper roof surface.



Photo 2

Overall view of the roof surface. Moderate ponding water is evident due to insufficient slope to the drains.



Photo 3

Significant debris and ponding around the drains. These need to be maintained and cleaned to to ensure proper drainage.



Photo 4

Flashing around the chimney stack along the southern side of the roof.



Photo 5

View of the pipe penetration on the roof surface.



Photo 6

Existing metal edge detail over the parapet.



Photo 7

There is leaves and debris on the roof system that should be cleaned off during routine maintenance.



Photo 8

View of the overflow scupper, which drains off the back of the building.



Photo 9

Electrical work and lighting on the parapet wall.



Photo 10

Core cut #1, high spot.
Approx. 3 1/2".

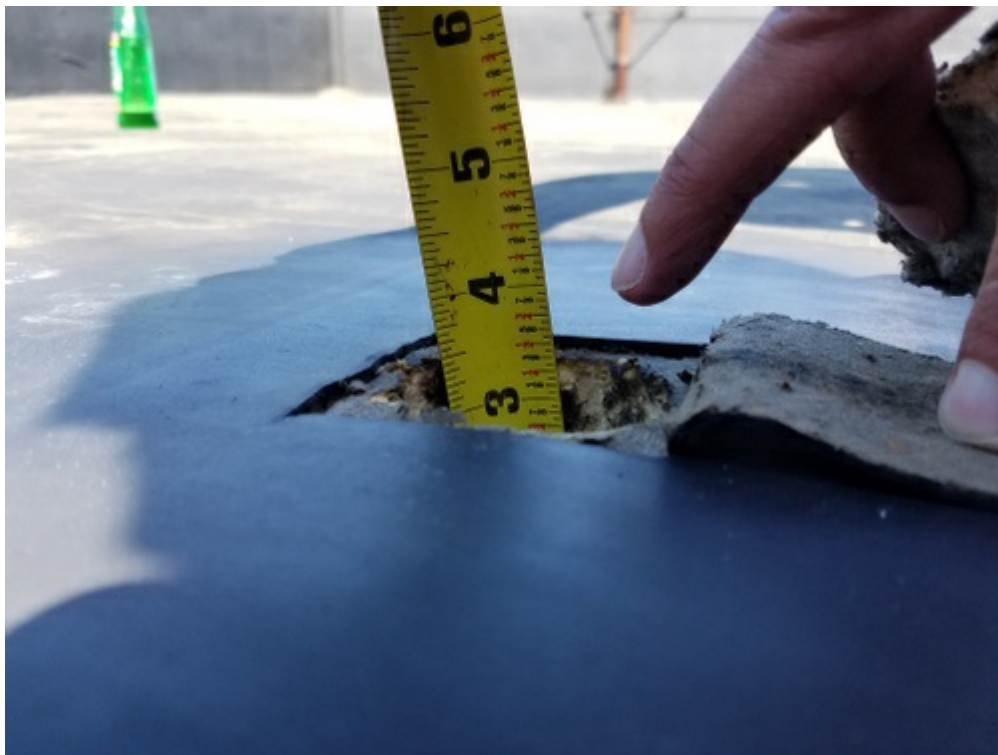


Photo 11

Core cut #1, depth of approx.
3 1/2".



Photo 12

Core cut #2, low spot near drain. Approx. 2".



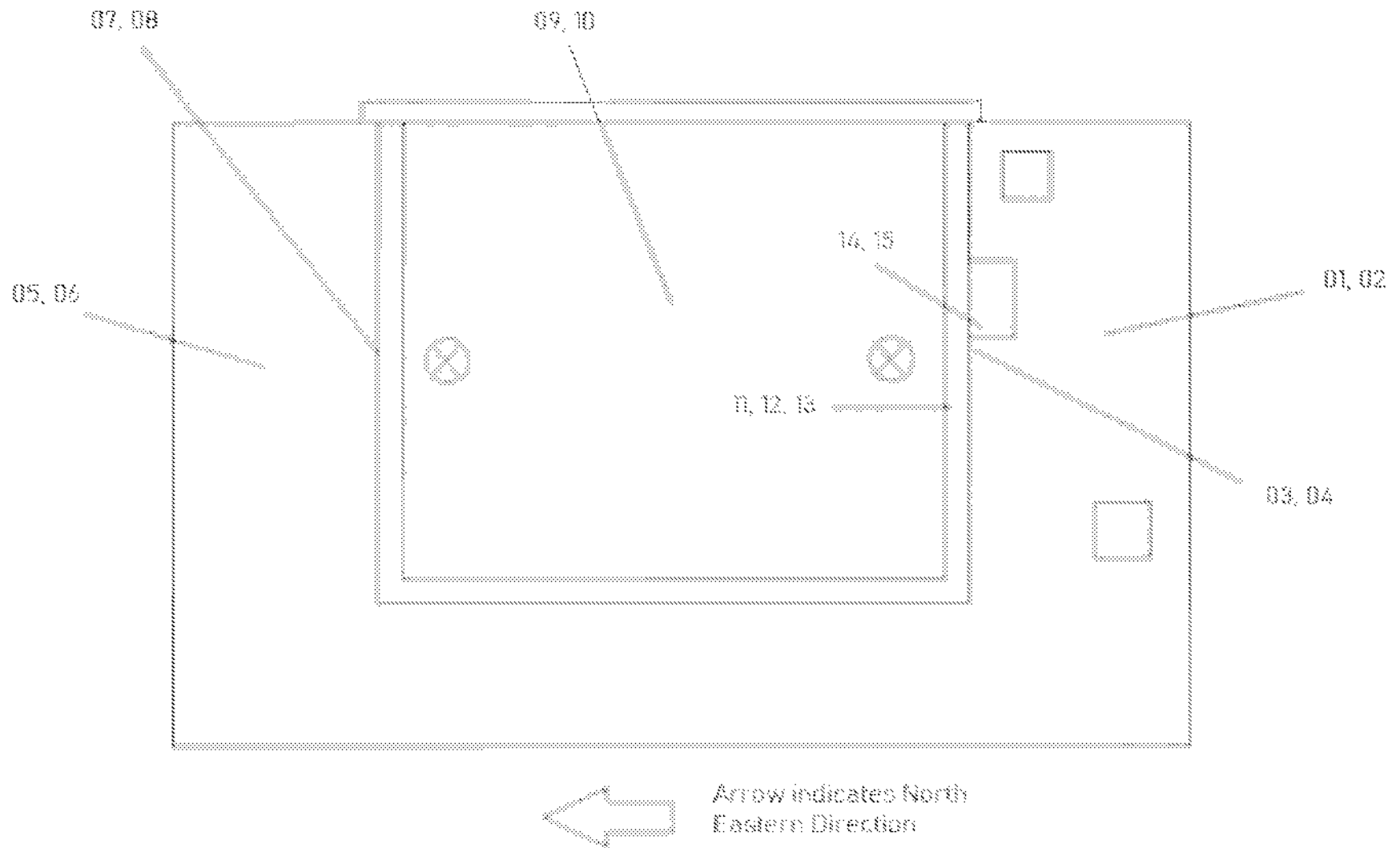
Photo 13

Core cut #2, low spot near drain. Approx. 2" in depth.

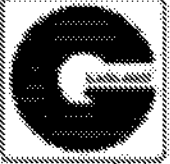
Exhibit F

Hazardous Material Survey - Pre-Renovation Asbestos

ROOF PLAN VIEW



NOTE: Drawing Not to Scale

	THE GARLAND COMPANY, INC.			PROJECT: Mt. Kisco WWTP	
	GARLAND CANADA, INC.			CUSTOMER: Delaware Engineering	
	THE GARLAND COMPANY UK, LTD			ARCHITECT: Delaware Engineering	
				REPRESENTATIVE: John Lesko	
				DATE: 6/23/2021	SMT: 1 OF 1

Date of Sampling: 06/18/2021 Job #: U5-3479
Date of Sample Receipt: 06/21/2021 Order#: 0621372
Client: THE GARLAND COMPANY #Received: 5
202 HANS CREEK ROAD
BROADABLIN, NY 12025

Attn: JOHN LESKO

Location: WATER TREATMENT PLANT/ SAW MILL PARKWAY/ MT.
KISCO/ NY

Field Technician: Alan Young
Date of Analysis: 06/23/2021
Date of Issue: 06/23/2021



HILLMANN CONSULTING, L.L.C.
ENVIRONMENTAL CONSULTING, LAB SERVICES
1600 ROUTE 22 EAST
P.O. BOX 1597
UNION, NEW JERSEY 07083-1597
PHONE: (908) 688-7800 FAX: (908) 686-2636
www.hillmannconsulting.com

TEM BULK SAMPLE CERTIFICATE OF ANALYSIS

Method: New York State ELAP Method 198.4

LAB ID #				Non-Asbestos		Asbestos Type(s)
Client ID #	Location	Description	Fibrous	(%)	Non-Fibrous	(%)
TB59073	Roof/ Low Roof South	Top Layer, Homogeneous			Non-Fibrous Material	100% None Detected
TB59074	Roof/ Low Roof South	Caulk, Homogeneous			Non-Fibrous Material	100% None Detected
TB59075	Roof/ Low Roof North	Top Layer, Homogeneous			Non-Fibrous Material	100% None Detected
TB59076	Roof/ Low Roof North	Caulk, Homogeneous			Non-Fibrous Material	100% None Detected
TB59077	Upper Roof	Top Layer, Homogeneous			Non-Fibrous Material	100% None Detected

This report is not complete without the chain of custody, which contains the time of sample collection. The laboratory is not responsible for time of sample collection, which is dependent on non-laboratory personnel, if it is not provided.

Accreditations #: NYS ELAP Laboratory ID # 10926 NJDEP Laboratory ID # 20037 CT # PH-0797

NOTES: NAD denotes- NO ASBESTOS DETECTED / Inconclusive. N/A - Not Analyzed.
The samples in this report were not collected by Laboratory personnel therefore bears no responsibility for sample collection activities or analytical method limitations.
This report relates only to the samples tested. The report, or certificate, shall not be reproduced, except in full, without the written approval of the laboratory.
Samples were accepted upon receipt unless otherwise noted. Scope: JEOL 1010.

Signature: _____

Mina Beshay Senior TEM Analyst

#Analyzed: 5

Date of Sampling: 06/18/2021
Date of Sample Receipt: 06/21/2021
Client: THE GARLAND COMPANY
202 HANS CREEK ROAD
BROADABLIN, NY 12025

Job #: U5-3479
Order#: 0621343
#Received: 15



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PHONE: (908) 688-7800 FAX: (908) 686-2636
www.hillmannconsulting.com

Attn: JOHN LESKO

Location: WATER TREATMENT PLANT/ SAW MILL PARKWAY/ MT.
KISCO/ NY

Field Technician: Alan Young
Date of Analysis: 06/22/2021
Date of Issue: 06/22/2021

BULK SAMPLE CERTIFICATE OF ANALYSIS

Method: EPA/600/M4-82-020 per 40CFR: PLM with Dispersion Staining

LAB ID #	Client ID #	Location	Sample Description	Asbestos Detected? (Yes/No)	Asbestos Constituents (%)	Non-Asbestos Constituents (%)
W351250	AY061821-1	Roof/ Low Roof South	Iso Board Insulation, Homogeneous	No		Cellulose Fiber 25% Non-Fibrous Material 75%
W351251	2	Roof/ Low Roof South	Top Layer Roof, Homogeneous Note: Gravimetric Reduction	No		Non-Fibrous Material 100%
W351252	3	Roof/ Low Roof South	Caulk, Homogeneous Note: Gravimetric Reduction	No		Non-Fibrous Material 100%
W351253	4	Roof/ Low Roof South	Flashing Tar, Homogeneous Note: Gravimetric Reduction	Yes	Chrysotile 13%	Non-Fibrous Material 87%
W351254	5	Roof/ Low Roof North	Iso Board Insulation, Homogeneous	No		Cellulose Fiber 25% Non-Fibrous Material 75%
W351255	6	Roof/ Low Roof North	Top Layer Roof, Homogeneous Note: Gravimetric Reduction	No		Non-Fibrous Material 100%
W351256	7	Roof/ Low Roof North	Caulk, Homogeneous Note: Gravimetric Reduction	No		Non-Fibrous Material 100%
W351257	8	Roof/ Low Roof North	Flashing Tar, Homogeneous Note: Gravimetric Reduction	Yes	Chrysotile 4.5%	Non-Fibrous Material 95.5%
W351258	9	Upper Roof	Iso Board Insulation, Homogeneous	No		Cellulose Fiber 25% Non-Fibrous Material 75%

Signature:

Dylan Jaycox, Laboratory Director

#Analyzed: 14



Date of Sampling: 06/18/2021
Date of Sample Receipt: 06/21/2021
Client: THE GARLAND COMPANY
202 HANS CREEK ROAD
BROADABLIN, NY 12025

Job #: U5-3479
Order#: 0621343
#Received: 15



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www.hillmannconsulting.com

Attn: JOHN LESKO

Location: WATER TREATMENT PLANT/ SAW MILL PARKWAY/ MT.
KISCO/ NY

Field Technician: Alan Young
Date of Analysis: 06/22/2021
Date of Issue: 06/22/2021

BULK SAMPLE CERTIFICATE OF ANALYSIS

Method: EPA/600/M4-82-020 per 40CFR: PLM with Dispersion Staining

LAB ID #	Client ID #	Location	Sample Description	Asbestos Detected? (Yes/No)	Asbestos Constituents (%)	Non-Asbestos Constituents (%)
W351259	10	Upper Roof	Top Layer Roof, Homogeneous Note: Gravimetric Reduction	No		Non-Fibrous Material 100%
W351260	11	Upper Roof	Gypsum Board Parapet, Homogeneous	No		Non-Fibrous Material 100%
W351261	12	Upper Roof	Gypsum Board Parapet, Homogeneous	No		Non-Fibrous Material 100%
W351262	13	Upper Roof	Top Layer Roof Flashing, Homogeneous Note: Gravimetric Reduction	No		Non-Fibrous Material 100%
W351263	14	Upper Roof Chimney	Flashing Tar, Homogeneous Note: Gravimetric Reduction	Yes	Chrysotile 13%	Non-Fibrous Material 87%
W351264	15	Upper Roof Chimney	Flashing Tar, Homogeneous Note: Gravimetric Reduction Note: Not Analyzed/Positive Stop			

This report relates only to the materials tested and may not be duplicated in part without written permission by Hillmann Consulting. Samples are analyzed according to the EPA Test Method and are subject to the inherent limitations of Polarized Light Microscopy and interference of matrix components. This report must not be used to claim product endorsement by NVLAP or any agency of the US government.

This report is not complete without the chain of custody, which contains the time of sample collection. The laboratory is not responsible for time of sample collection, which is dependent on non-laboratory personnel, if it is not provided.

Signature: _____

Dylan Jaycox, Laboratory Director

#Analyzed: 14



BULK SAMPLE RESULTS

Enclosed please find the Certificates of Analysis for bulk samples analyzed for asbestos content by Hillmann Consulting, LLC. All fibrous components including type and percentage of asbestos, of present, are reported. Percentages given are visual estimates under microscopical observation, unless otherwise indicated by codes. This test report only relates to items tested.

The method of analysis used is Polarized Light Microscopy (PLM) with dispersion staining. Hillmann follows the EPA and the National Voluntary Laboratory Accreditation Program (NVLAP) recommended method of analysis EPA-600/M4-82-020: Interim Method for the Determination of Asbestos in Bulk Insulation Samples and EPA 600/R-93/116 published July 1993 is also used for guidance.

Non-friable organically bound (NOB) sample results reported as negative (less than 1% asbestos) must be considered Inconclusive (ELAP Item 198.6, 01/02/09).

Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing (ELAP Item 198.6, 01/02/09).

All analysis and certificates of analysis shall meet all requirements of the most current NELAC Standards, NYELAP Regulations, and NVLAP-NIST Handbook 150, most current version.

This report cannot be used to claim product endorsement by NVLAP or any agency of the U.S. Government. The National Institute of Standards and Technology Accreditation requirements, mandates that this report must not be reproduced, except in full without the written approval of the laboratory. This report may contain specific data not covered by NVLAP, ELAP, or NELAC accreditations respectively, if so identified in the notes.

NY ELAP Item 198.6 does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.

Listed below are explanations of notes and or sample descriptions contained within certificates of analysis.

- Homogeneous- Sample is composed of a uniformed material, and analyzed as such.
- Non-homogenous- All components were analyzed as discreet layers. The results reported indicated the contents of the sample as a whole. Results of each layer are available upon request by the client.
- Recommended TEM- Polarized Light Microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing. (NY ELAP Regulation Item 198.6, 1/11/05).
- 400 Point Counting- Sample was determined less than 10% positive by visual estimation. Sample was point counted as specified in NESHAPS regulations Federal Registration Vol. 55, No. 224, November 20, 1990, EPA to verify asbestos content quantification.
- Stratified Point Counting - Point Counting Criteria for friable bulk sample as dictated by NY ELAP Regulation Item 198.1, 1/11/05.
- Gravimetric Reduction- Sample has been heated, and undergone acid digestion to reduce interfering substances before analysis. (Item 198.6 of NY ELAP Manual (NOB by PLM))
- Final % Inorganic < 1- The percentage of Inorganic material is less than 1, resulting in the sample being Non-ACM. (NY ELAP Regulation Item 198.6, 1/11/05).

Hillmann's Laboratory Accreditations:

ELAP # 10926
NJ NELAC # 20037
NVLAP # 101421-0
VA # 3333 000203
MA # AA000183
TX # 300405
WV # LT000427
PA # 68-00774
CA # 2924
RI # AAL-128
CT # PH-0797
ME # LB-0084
Philadelphia # ALL15-000003

Signature: _____

Dylan Jaycox, Laboratory Director

#Analyzed: 14



HILLMANN CONSULTING

Environmental Consulting & Lab Services, 1600 Route 22 East, Union, NJ 07083
(908) 688-7800 Fax (908) 686-2636 email: @hillmanngroup.com

BULK SAMPLE IDENTIFICATION FORM PLM COC, Version 3.3

DATE: 6/18/21
JOB#: 053479

CLIENT: GARLAND ROOFING

LOCATION: WATER TREATMENT PLANT, SAW MILL PARKWAY, MT. KISCO, NY

☒ POSITIVE STOP ON ALL HOMOG. SAMPLES

TAT for PLM - 3-6hrs 8-12hrs 24hrs 48hrs 72hrs 5-7day
TAT for TEM - 3-6hrs 8-12hrs 24hrs 48hrs 72hrs 5-7day
TAT for SOF-V - 1wk 2wk

LAB Instructions:									
•ANALYZE ALL NOBS AS INDICATED BY "VIA TEM IF NEGATIVE VIA PLM. POSITIVE STOP ON TEM ONLY" •ANALYZE BOTTOM / INNER LAYERS FIRST AS INDICATED BY "BL" - IF POSITIVE THEN STOP ANALYSIS OF OTHER LAYERS									
Homg. ID	Sample # Lab #	Floor/Room	Location Description	Material Description Color	Quantity In SOW?	Cond Friable?	NOB	Time Sample Collected	Lab Results
	A4061821-01 (b) 52	R	LOW ROOF SOUTH	ISO BOARD INSULATION					CELL 25 MC 75
	A4061821-02 (b) 52	R	LOW ROOF SOUTH	TOP LAYER ROOF			X		MC 1W
	A4061821-03 (b) 52	R	LOW ROOF SOUTH	CAULK			X		MC 1W
	A4061821-04 (b) 52	R	LOW ROOF SOUTH	FLASHING TAR			X		CA 13 MC 87
	A4061821-05 (b) 54	R	LOW ROOF NORTH	ISO BOARD INSULATION					CELL 25 MC 75
	A4061821-06 (b) 52	R	LOW ROOF NORTH	TOP LAYER ROOF			X		MC 1W
	A4061821-07 (b) 52	R	LOW ROOF NORTH	CAULK			X		MC 1W
	A4061821-08 (b) 52	R	LOW ROOF NORTH	FLASHING TAR			X		CA 4.5 MC 95.5
	A4061821-09 (b) 52	UR	UPPER ROOF	ISO BOARD INSULATION					CELL 25 MC 75
	A4061821-10 (b) 52	UR	UPPER ROOF	TOP LAYER ROOF			X		MC 1W

CHAIN OF CUSTODY

SAMPLED BY:	TRANSPORTED BY:	RECEIVED BY:	ANALYZED BY:	Spaces Occupied?
Print <u>ALAN YOUNG</u>	<u>FEJ ET</u>			Spaces Operating?
Sign <u>[Signature]</u>		<u>[Signature]</u>	<u>[Signature]</u>	Access Issues?
Date <u>6/18/21</u>		<u>0930 6/21/21</u>	<u>6/22/21</u>	

Material Codes

AP=acoustical plaster, BC=brown coat, BF=base flashing, BUR=built-up roofing, CB=cove base, CBM=cove base mastic, CF=curb flashing, CFT=ceramic floor tile, CM=carpet mastic, CPM=carpet padding mastic, CPT=carpet tile mastic, CT=ceiling tile, CTM=CT mastic, CWT=ceramic wall tile, FP=fireproofing, JC=joint compound, JT=joint tape, LC=leveling compound, PL=plaster, PP=pitch pocket, PPW=parapet wall flashing, RFP=reinforced fiber/glass panel, SP=soundproofing, TP=tar paper, VB=vapor barrier, VCT=vinyl floor tile, VCTM=VCT mastic, VSF=vinyl sheet flooring, WB=wallboard, WPA=wall paper adhesive, PI=pipes insulation, PFI=pipes fitting insulation, FG= fiberglass line ALL OTHER DESCRIPTIONS MUST BE WRITTEN OUT

Technical Specifications

SECTION 01010
SUMMARY OF WORK – CONTRACT #2021-05

CONTRACT #2021-05 – GENERAL CONSTRUCTION

PART 1. GENERAL

1.01 SUMMARY

- A. Contract #2021-05 consists of the rehabilitation of the Saw Mill Pump Station.

1.02 PROJECT AND SITE CONDITIONS

- A. Project and site conditions are generally illustrated on the Drawings. CONTRACTOR is responsible for inspecting all work locations and familiarizing himself with conditions affecting the work prior to submitting a bid for the work.
- B. The approximate locations of known underground utilities are shown on Drawings for CONTRACTOR's information. This does not relieve CONTRACTOR from the requirement to locate and protect the utilities.

1.03 COORDINATION WITH UTILITY COMPANIES

- A. The CONTRACTOR shall notify NYS Dig Safely and pertinent utility companies 72 hours in advance of doing any work at or adjacent to said utilities. All requirements of NYCRR 53 & NYS Code Rule 753 are applicable to this contract.

1.04 DESIGN ENGINEER'S ESTIMATE OF QUANTITIES

- A. Bid Items and estimated quantities are presented on the Bid Form included in these Contract Documents. The estimated quantities for unit price pay items are approximate only and are included solely for the purpose of comparison of bids.
- B. The OWNER does not expressly or by implication agree that the nature of the materials encountered below the surface of the ground or the actual quantities of materials encountered or required will correspond therewith and reserves the right to increase or decrease any quantity or to eliminate any quantity as OWNER may deem necessary.
- C. CONTRACTOR will not be entitled to any adjustment in a unit bid price as a result of any change in an estimated quantity and agrees to accept the aforesaid unit bid prices as complete and total compensation for any additions or deductions caused by a variation in quantities, as a result of more accurate field measurement or by any changes or alterations in the Work ordered by the OWNER. If the actual quantities measured in the field are 100 % over or under the original estimated quantities, then the unit price may be adjusted by negotiation.
- D. This Summary of Work is **not** intended to substitute for thorough review of all Contract Drawings and Specifications by the CONTRACTOR. Items not specifically included in the Summary of Work but shown on the Contract Drawings and Specifications are the responsibility of the CONTRACTOR to complete. The CONTRACTOR shall include the cost of completing these items in the Bid Item most closely associated to the work item in question. No additional compensation will be provided to the CONTRACTOR for any of these items.

1.05 UNIT PRICE WORK REQUIREMENTS INCLUDE

- A. This section identifies Bid items by number and lists applicable Specification sections and method of measurement and payment.
- B. Provide all labor, materials, equipment, supplies, supervision, overhead & profit, and all services necessary to furnish and install each Bid item as required by Contract Documents. See general conditions of the contract 11.03 Unit Price Work; Sections A, B, and C.

SECTION 01010
SUMMARY OF WORK – CONTRACT #2021-05

1.06 MEASUREMENTS FOR PAYMENT

A. Bid items

1. For unit price items, the CONTRACTOR shall be paid based on actual quantities measured in the field, as shown on the pay limits of the contract plans and described in the bid form times the unit price on the bid form. The measurement for each bid item is listed under Part 3-Execution of this specification.
2. For lump sum items, the CONTRACTOR shall be paid either by partial payments or Lump Sum after the completion of the bid item. For partial payments, the CONTRACTOR shall submit for ENGINEER's review and approval a "schedule of values" that shall provide the basis for partial payments. The total costs of all components of work shall equal the Lump Sum bid for this Item.

B. CONTRACTOR shall prepare monthly payment requests in a standard form as given by the ENGINEER. CONTRACTOR shall review a preliminary payment request with the ENGINEER prior to submittal of the formal request.

C. On a daily basis as required, CONTRACTOR shall review daily production and payment quantities with the ENGINEER.

D. After the completion of the project, the measurements for each bid item shall be re-measured where necessary. The remaining payments from the OWNER to the CONTRACTOR shall be adjusted accordingly to the final measurements of the bid items.

PART 2. PRODUCTS

This section is not used. Refer to individual specification sections for more information on each bid item.

PART 3. EXECUTION

GENERAL

3.01 MOBILIZATION AND GENERAL CONSTRUCTION

- A. Mobilization and General Construction bid item for the project shall be no more than the maximum 3.0 % of the total project cost.
- B. Measurement and Payment for these items will be made as progress payments against the Lump Sum Price bid on the Bid Form included in the Contract Documents.
- C. Payment under these Items shall be the same regardless of whether additional work is done or if the Contract is extended.
 1. Upon completion of mobilization as approved by the ENGINEER, two-third (2/3) of the items shall be considered complete and payments made.
 2. The remainder of the payments under these Items shall be made on a regular monthly basis that accounts for equal payment for General Construction Work throughout the Contract schedule, except that ENGINEER may withhold such payments for failure to complete General Construction work not specifically included elsewhere in the Documents, provided 10-days advance written notice has been provided to CONTRACTOR of the deficiency.
- D. The lump sum bid shall include all costs for labor, materials, equipment, overhead & profit, and supplies required to complete the work including:
 1. Record Drawings, Project Photos and Project Videos.
 2. Certified Payrolls, MWBE documents, and other project documentation.

SECTION 01010
SUMMARY OF WORK – CONTRACT #2021-05

3. Procurement and maintenance of all local and state highway permits.
4. Maintenance and documentation of project schedule.
5. Maintenance of temporary field facilities.
6. Procurement and maintenance of required Insurances and Bonds.
7. Shop drawings and material submittals
8. Health and Safety Plans
9. Mobilization of equipment
10. Mobilization of work force
11. All other work required by the Contract Documents but not listed individually under other Bid Items.

Bid Item G.1 – Mobilization and General Construction

3.02 PUMP SYSTEM MODIFICATIONS

- A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.
- B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
- C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
 1. Layout
 2. Furnishing and installing all components of the main influent pump station modifications including but not limited to:
 - adherence to the construction sequencing schedule – Section 01305
 - all demolition work per the Contract Plans
 - replacement of six pumps complete with all piping modifications as required for the connection of the new pumps to the existing piping.
 - All required factory testing and certified pump curves
 - demolition of the existing equipment pad and replacement per the replacement pump manufacturers recommendations
 - all necessary vibration analysis per specifications
 - all pump suction and discharge piping modifications
 - all isolation valves and check valves. Installation of isolation knife gate valves shall be done at low flow times and not during wet weather.
 - all finishes and painting
 - all pressure gauges.
 - all pressure and leakage tests
 - all equipment start-up and testing
 3. Temporary support and maintenance of other utilities and structures affected by the work.
 4. Compliance with all lead abatement requirements. The existing piping paint is assumed to contain lead.
 5. Other appurtenant and incidental work

BID ITEM G.2– ALL components of the new pumping systems according to these Contract Documents and the above conditions.

SECTION 01010
SUMMARY OF WORK – CONTRACT #2021-05

3.03 NEW WASTEWATER GRINDER SYSTEMS

- A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.
- B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
- C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
 - 1. Layout
 - 2. Furnishing and installing all components of the grinders and including but not limited to:
 - all demolition work per the Contract Plans
 - adherence to the construction sequencing schedule – Section 01305
 - Two new grinders, complete with controls and all appurtenances
 - Any additional requirements to assemble grinders in the field
 - All required temporary structures to facilitate channel shut down and screen installation
 - Replacement of all isolation gates
 - grinder control panel
 - channel modifications and cleaning
 - all finishes and painting
 - all equipment start-up and testing
 - 3. Temporary support and maintenance of other utilities and structures affected by the work.
 - 4. Other appurtenant and incidental work

BID ITEM G.3 – All components of the new grinder equipment systems according to these Contract Documents and the above conditions.

3.04 EXISTING PUMP STATION BUILDING REHABILITATION

- A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.
- B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
- C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including but not limited to:
 - 1. Layout
 - 2. Furnishing and installing all rehabilitation components of the pump station building including but not limited to:
 - adherence to the construction sequencing schedule – Section 01305
 - all demolition work per Contract Plans
 - all floor finish rehabilitation
 - new jib crane per specifications
 - removal of the existing 5000 gal subsurface fuel oil tank per specifications
 - new generator pad
 - include requires asbestos abatement in this bid item. This is to include all testing of material where demolition is to occur, a work plan based upon the testing results by a third party, and actual the actual abatement.
 - repair and infill of existing louvers
 - replacement of existing gas monitoring system and installation of new gas monitoring devices

SECTION 01010
SUMMARY OF WORK – CONTRACT #2021-05

- all ceiling rehabilitation
 - all pressure washing of the wet well walls
 - all new FRP grating
 - all new doors and windows, complete with hardware
 - all replacement doors and windows, complete with hardware
 - all room and railing finishes
 - all finishes and sealants (the General Contractor shall be responsible for sealing all penetrations, including penetrations by other trades)
 - all roof penetrations for HVAC and electrical upgrades
 - all roof repairs resulting from disturbances from all trades
 - coordination with other trades
 - all components of furnishing and installing new automated slide gate
3. compliance with all asbestos abatement requirements, including all independent laboratory monitoring and testing in accordance with the Specifications
 4. compliance with all lead containment requirements
 5. Other appurtenant and incidental work

BID ITEM G.4 – All building rehabilitation according to these Contract Documents and the above conditions.

3.05 PUMP STATION CONTROL SYSTEM REQUIREMENTS

- A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.
- B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
- C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
 1. Layout
 2. Furnishing and installing all components of all modifications, additions and new work regarding the SCADA system, including but not limited to:
 - furnishing and installation of all variable frequency drives
 - furnishing and installation of all instrumentation equipment per Specifications including all new flow meters, pressure transducers, gas monitors and floats.
 - all design and execution of all existing PLC upgrades, complete with all additional hardware, software and all other components as necessary to furnish a complete and functional pump control system per the Specifications
 - all terminations and landings of all signal wiring (electrical contractor shall install the conduit and conductors)
 - coordination with the electrical contractor regarding conduits and conductors
 - furnishing and installation of all new control cabinets, complete with all necessary hardware, software and all other components as necessary to furnish a complete and functional pump control and control system per the Specifications
 - all programming and associated work
 - coordination with applicable equipment suppliers to ensure compatibility of equipment control panels with the pump control architecture
 - furnishing, installation and programming of all pump control system computers and the servers. The software and programming are part of this item.
 - all other pump station control work per the Contract Plans and Specifications
 3. Other appurtenant and incidental work

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4. Temporary support and maintenance of other utilities and structures affected by the work.
5. Other appurtenant and incidental work

BID ITEM G.5 – All components of the pump station control system according to these Contract Documents and the above conditions.

3.06 SAW MILL PUMP STATION GENERAL ELECTRICAL

- A. Measurement and Payment for furnishing and installing conduit, conductors, switches, junction boxes, and pull boxes at the Monroe Pump Station shall be a Lump Sum basis and no Measurement for Payment shall be made.
- B. Payment under these Items shall be the same regardless of whether additional work is done or if the Contract is extended.
- C. Payment for this item shall be made based on the Lump Sum bid for Bid Item E.1 on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
- D. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
 1. Layout and survey.
 2. Furnishing and Installing all conduit and conductors on drawings.
 3. Furnish and install all pull and junction boxes.
 4. Furnish and install all hangers, fasteners, etc.
 5. Other appurtenant and incidental work

Bid Item E.1 – Furnish and install all General Electrical Components for the Saw Mill Pump Station.

3.07 SAW MILL PUMP STATION FURNISHING AND INSTALLATION OF NEW ELECTRICAL GEAR

- A. Measurement and Payment furnishing and installing new gear at the Saw Mill Pump Station shall be a Lump Sum basis and no Measurement for Payment shall be made.
- B. Payment under these Items shall be the same regardless of whether additional work is done or if the Contract is extended.
- C. Payment for this item shall be made based on the Lump Sum bid for Bid Item E.2 on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
- D. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
 1. Demo existing MCC.
 2. Label all conduits and conductors.
 3. Furnish and install new gear.
 4. Test new gear.
 5. Meger test all power conductors.
 6. Other appurtenant and incidental work

Bid Item E.2 – Furnish and install new gear for the Saw Mill Pump Station.

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- 3.08 INSTALL CONDUIT AND CONDUCTORS FOR THE GRINDER CP IN THE SAW MILL PUMP STATION
- A. Measurement and Payment for furnishing and installing breakers for the Grinders at the Saw Mill Pump Station shall be a Lump Sum basis and no Measurement for Payment shall be made.
 - B. Payment under these Items shall be the same regardless of whether additional work is done or if the Contract is extended.
 - C. Payment for this item shall be made based on the Lump Sum bid for Bid Item E.3 on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
 - D. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
 - 1. Furnish and install conduit and conductor from the gear to the grinder control panel.
 - 2. Furnish and install conduit and conductors from the grinder control panel to grinder #1, grinder #2.
 - 3. Furnish and install conduit and conductors from the grinder control panel to the new pump station control panel.
 - 4. Cap all concrete encased abandoned conduit for the comminutors.
 - 5. Remove all exposed abandoned conduit to the comminutors.
 - 6. Other appurtenant and incidental work

Bid Item E.3 – Furnish and install new conduit and conductors for the grinders at the Saw Mill Pump Station.

- 3.09 FURNISH AND INSTALL PUMP CONDUIT AND CONDUCTORS AT THE SAW MILL PUMP STATION.
- A. Measurement and Payment for furnishing and installing conduit and conductors for the Pumps at the Saw Mill Pump Station shall be a Lump Sum basis and no Measurement for Payment shall be made.
 - B. Payment under these Items shall be the same regardless of whether additional work is done or if the Contract is extended.
 - C. Payment for this item shall be made based on the Lump Sum bid for Bid Item E.4 on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
 - D. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
 - 1. Furnish and install conduit and conductors from the electrical to Pump #1, #2, #3, #4, #5 and #6 VFDs.
 - 2. Furnish and install conduit and conductors from Pump #1, #2, #3, #4, #5 and #6 VFDs to the Pump #1, #2, #3, #4, #5 and #6 motors.
 - 3. Furnish and install conduit and conductor from the Pump #1, #2, #3, #4, #5 and #6 VFDs to the thermal sensors on Pump #1, #2, #3, #4, #5 and #6.
 - 4. Furnish and install conduit and conductor from the Pump #1, #2, #3, #4 #5 and #6 VFDs to the moisture sensors on Pump #1, #2, #3, #4, #5 and #6.
 - 5. Remove all abandoned conduit and conductors.
 - 6. Cap all concrete encased abandoned conduit.
 - 7. Other appurtenant and incidental work

Bid Item E.4 – Furnish and install conduit and conductors for the VFDs and new pumps at the Saw Mill Pump Station.

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3.10 FURNISH AND INSTALL CONDUIT AND CONDUCTOR FOR WETWELL BLOWERS AT THE SAW MILL PUMP STATION.

- A. Measurement and Payment for furnishing and installing conduit and conductors for the thermal, and moisture sensors at the Saw Mill Pump Station shall be a Lump Sum basis and no Measurement for Payment shall be made.
- B. Payment under these Items shall be the same regardless of whether additional work is done or if the Contract is extended.
- C. Payment for this item shall be made based on the Lump Sum bid for Bid Item E.5 on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
- D. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
 - 1. Furnish and install conduit and conductor from the MSDP to the Wetwell blower VFDs and then onto the blowers.
 - 2. Furnish and install Disconnects for the blowers.
 - 3. Other appurtenant and incidental work

Bid Item E.5 – Furnish and install conduit and conductors for wetwell blowers at the Saw Mill Pump Station.

3.11 FURNISH AND INSTALL CHECK VALVE CONDUIT AND CONDUCTOR AT THE SAW MILL PUMP STATION.

- A. Measurement and Payment for furnishing and installing conduit and conductors for the Valve controls at the Saw Mill Pump Station shall be a Lump Sum basis and no Measurement for Payment shall be made.
- B. Payment under these Items shall be the same regardless of whether additional work is done or if the Contract is extended.
- C. Payment for this item shall be made based on the Lump Sum bid for Bid Item E.6 on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
- D. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
 - 1. Furnish and install conduit and conductor from the new check valve #1, #2, #3, #4, #5 and #6 to the new pump station control panel.
 - 2. Furnish and install conduit and conductors to the pressure switches located at the pumps.
 - 3. Other appurtenant and incidental work

Bid Item E.6 – Furnish and install conduit and conductors for the check valve controls at the Saw Mill Pump Station.

3.12 FURNISH AND INSTALL CONDUIT AND CONDUCTORS FOR THE INSTRUMENTATION AT THE SAW MILL PUMP STATION.

- A. Measurement and Payment for furnishing and installing conduit and conductors for the instrumentation at the Saw Mill Pump Station shall be a Lump Sum basis and no Measurement for Payment shall be made.
- B. Payment under these Items shall be the same regardless of whether additional work is done or if the Contract is extended.

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- C. Payment for this item shall be made based on the Lump Sum bid for Bid Item E.7 on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
- D. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
 - 1. Furnish and install conduit and conductor from the pump station control panel to the flow meters for power and controls.
 - 2. Furnish and install conduit and conductor from the pump station control panel to the Hydrogen Sulfide, Oxygen, and Methane detectors for power and controls.
 - 3. Furnish and install conduit and conductor from the pump station control panel to the Level Transducer for power and controls.
 - 4. Furnish and install conduit and conductor from the pump station control panel to the floats.
 - 5. Other appurtenant and incidental work

Bid Item E.7 – Furnish and install conduit and conductors for instrumentation at the Saw Mill Pump Station.

3.13 FURNISH AND INSTALL CONDUIT AND CONDUCTORS FROM THE VFDS TO THE SAW MILL PUMP STATION CP.

- A. Measurement and Payment for furnishing and installing conduit and conductors from the VFD's to the control panel at the Saw Mill Pump Station shall be a Lump Sum basis and no Measurement for Payment shall be made.
- B. Payment under these Items shall be the same regardless of whether additional work is done or if the Contract is extended.
- C. Payment for this item shall be made based on the Lump Sum bid for Bid Item E.8 on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
- D. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
 - 1. Furnish and install conduit and conductor from VFD #1, #2, #3, #4, #5, and #6 to the pump station control panel for speed in, speed out, fault, HOA status, start, etc.
 - 2. Furnish and install conduit and conductor from the lighting panel to the pump station control panel.
- E. Other appurtenant and incidental work

Bid Item E.8 – Furnish and install conduit and conductors from the VFDS to the pump station cp at the Saw Mill Pump Station.

3.14 FURNISH AND INSTALL NEW GENERATOR AT THE SAW MILL PUMP STATION

- A. Measurement and Payment for furnishing and installing new generators at the Saw Mill Pump Station shall be a Lump Sum basis and no Measurement for Payment shall be made.
- B. Payment under these Items shall be the same regardless of whether additional work is done or if the Contract is extended.
- C. Payment for this item shall be made based on the Lump Sum bid for Bid Item E.9 on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.

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- D. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
1. Layout and survey.
 2. Demo existing generator.
 3. Disconnect and remove existing generator controller
 4. Furnish and install new generator.
 5. Coordinate pad installation with general contractor. General contractor shall furnish and install concrete pads for generator.
 6. Furnish and install new ATS
 7. Other appurtenant and incidental work

Bid Item E.9 – Furnish and install new generator for the Saw Mill Pump Station.

3.15 FURNISH AND INSTALL NEW ELECTRICAL SERVICE AT THE SAW MILL PUMP STATION

- A. Measurement and Payment for furnishing and installing new electrical service at the Saw Mill Pump Station shall be a Lump Sum basis and no Measurement for Payment shall be made.
- B. Payment under these Items shall be the same regardless of whether additional work is done or if the Contract is extended.
- C. Payment for this item shall be made based on the Lump Sum bid for Bid Item E.10 on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
- D. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
1. Layout and survey.
 2. Demo existing electrical service.
 3. Demo existing transformer pad.
 4. Furnish and install new transformer pad (see structural details for pad details.
 5. Furnish and install new transformer.
 6. Furnish and install new main disconnect switch.
 7. Furnish and install new conduit and conductors from the pole to the transformer to the MDS etc.
 8. The utility charge will be paid through a separate utility allowance on the bid form and shall not be included in this bid item.
 9. Other appurtenant and incidental work.

Bid Item E.10– Furnish and install new electric service for the Saw Mill Pump Station.

3.16 FURNISH AND INSTALL NEW LIGHTING AT THE SAW MILL PUMP STATION

- A. Measurement and Payment for furnishing and installing new lighting at the Saw Mill Pump Station shall be a Lump Sum basis and no Measurement for Payment shall be made.
- B. Payment under these Items shall be the same regardless of whether additional work is done or if the Contract is extended.
- C. Payment for this item shall be made based on the Lump Sum bid for Bid Item E.11 on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
- D. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
1. Layout and survey.
 2. Demo existing lighting.

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3. Furnish and install new lighting in the wetwell class 1 div 1.
4. Furnish and install new lighting in the electrical room.
5. Furnish and install new lighting in the pump room.
6. Furnish and install new lighting in the control room.
7. Furnish and install new exterior lighting.
8. Furnish and install all new lighting.
9. Other appurtenant and incidental work

Bid Item E.11 – Furnish and install new lighting for the Saw Mill Pump Station

3.17 SAW MILL PUMPING STATION - HVAC UPGRADES

- A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.
- B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
- C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete all components of the HVAC rehabilitation work of the Saw Mill Pumping Station including but is not limited to:
 1. Layout.
 2. All demolition, removal and disposal of existing systems.
 3. Coordination with the General Contractor regarding roof penetrations and repairs.
 4. Protection of all roof opening as required until final roof restoration is completed.
 5. Furnishing and installation of all HVAC upgrades per the Contract Plans and Specifications.
 6. Cleaning existing Ductwork includes water pressure washing where shown on Contract Plans.
 7. Painting existing Ductwork where shown on Contract Plans and Specifications.
 8. Clean and Service existing Control Damper/Louver per Manufacturers recommendation includes greasing all moving parts where shown on Contract Plans.
 9. Furnishing and installation of all HVAC components.
 10. Demolition of fuel oil lines to boiler
 11. This work includes final roof repairs. The HVAC Contractor is responsible for roof penetrations and repairs. The HVAC Contractor shall coordinate all work with the General and Electrical Contractors.
 12. Other appurtenant and incidental work

BID ITEM H.1 – All HVAC upgrade work for the Saw Mill Pumping Station according to these Contract Documents and the above conditions.

3.18 GENERAL PLUMBING

- A. Payment shall be made based on the Lump Sum bid on the Bid Form in the contract Documents. Partial payment shall be based on the approved schedule of values.
- B. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including piping systems, complete with plumbing fixtures, equipment, equipment connections, trimmings, insulation and painting, all as indicated and/or specified. This work includes but is not limited to:
 1. Layout
 2. All removals and demolition work, complete with disposal.
 3. Complete connections of new fixtures to existing systems of sanitary waste and vents.

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4. Furnish and install all plumbing fixtures as shown on the Contract Drawings
5. Connections of Hot and cold water lines to new fixtures
6. All components of pipe, equipment identification and painting; cleaning and testing.
7. All coring and sealing.
8. Furnish and install all piping, fittings, valves, meters, supports, insulation, pressure gauges, pressure transducers, pressure regulators, hose bibs, and all appurtenances.
9. All components of a new water system.
10. All components of relocating the existing roof drains as shown on the Contract Plans.
11. Applicable provisions of coordination (15300).
12. Roughing for and final plumbing connections to equipment furnished by other Divisions.
13. Cutting and patching associated with work under this Contract.
14. All work of every description, including labor and materials, as may reasonably be inferred as necessary to make the plumbing work complete.
15. Insulation included: In general, the insulation to be done includes the following:
 - a. Domestic cold water piping.
 - b. Domestic hot water piping.
 - c. Domestic hot water circulating piping.
 - d. Portions of existing insulation damaged during execution of work of this project.
17. Furnish and install all potable water piping and hose bibs in the pump station as shown on the Contract Drawings.
18. All equipment start-up and testing.
19. Other appurtenant and incidental work

BID ITEM P.1 – All plumbing work for the pump station upgrade according to these Contract Documents and the above conditions.

3.05 WETWELL PLUMBING MODIFICATIONS

- A. Payment shall be made based on the Lump Sum bid on the Bid Form in the contract Documents. Partial payment shall be based on the approved schedule of values.
- B. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
 1. Layout
 2. Furnishing and installing all components and all plumbing modifications to the wetwell area, including but not limited to:
 - a. All components of relocating the existing roof drains in the wetwell.
 - b. Furnish and install all piping, fittings, coupling, valves, supports, insulation, and all appurtenances.
 - c. All equipment start-up and testing.

BID ITEM P.2 – All components of Wetwell Plumbing according to these Contract Documents and the above conditions.

END OF SECTION

SECTION 01027
APPLICATIONS FOR PAYMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Procedures for preparation and submittal of Applications for Payment.

1.2 RELATED SECTIONS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.3 FORMAT

- A. AIA G702 - Application and Certificate for Payment and Continuation Sheets G703 as the proper form for Application for Payment.

1.4 PREPARATION OF APPLICATIONS

- A. Present required information in typewritten form or on electronic media printout.
- B. Execute certification by signature of authorized officer.
- C. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
- D. List each authorized Change Order as an extension on continuation sheet, listing Change Order number and dollar amount as for an original item of Work.
- E. Prepare Application for Final Payment as specified in Section 01700.

1.5 SUBMITTAL PROCEDURES

- A. Submit three copies of each Application for Payment.
- B. Submit an updated construction schedule with each Application for Payment.
- C. Payment Period: Submit at intervals stipulated in the Agreement.
 - 1. Maximum of every 30 days
- D. Submit under transmittal letter specified in Section 01300.

1.6 SUBSTANTIATING DATA

- A. When Architect/Engineer requires substantiating information, submit data justifying dollar amounts in question.
- B. Provide one copy of data with cover letter for each copy of submittal. Show Application number and date, and line item by number and description.

END OF SECTION

SECTION 01105
CARE AND PROTECTION OF PROPERTY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Protection of Property
- B. Work within Highway Right-of-Way
- C. Notice to Property Owner
- D. Work Within Agricultural Lands
- E. Work Within Wetlands

1.02 RELATED SECTIONS

- A. Section 01560 – Protection of the Environment
- B. Section 02110 – Clearing and Grubbing
- C. Section 02221 – Trenching & Excavation

1.03 PROTECTION OF PROPERTY

- A. Do not enter or occupy with men, tools, materials or equipment any land other than the right-of-way and easements without the written consent from the property owner.
 - 1. File a copy of the written consent with the ENGINEER.
 - 2. Assume full responsibility for the use of said private properties and defend the OWNER against all claims for damages from use of same.
- B. Provide and maintain all necessary watchman, barricades, lights and warning signs and take all necessary precautions for the protection and safety of the public, the OWNER, the ENGINEER and property.
- C. Continuously maintain adequate protection to all Work from damage, and take all reasonable precautions to protect the Public's and the OWNER's property from injury or loss arising in connection with this Contract.
- D. Make good any damage, injury or loss to the work and to the property of the OWNER and the Public resulting from lack of reasonable protective precautions, except as may be due to errors in the Contract Documents, or caused by the agents or employees of the OWNER.
- E. In an emergency affecting the safety of life, the work, or adjoining property, the CONTRACTOR is, without special instructions or authorization from the ENGINEER, hereby permitted to act at his sole discretion to prevent such threatened loss or injury. He shall also act, without appeal, if so authorized or instructed by the ENGINEER.
- F. Any compensation claimed on account of emergency work, to protect the public, the work, or adjoining property, will be determined by agreement or by arbitration.
- G. Exercise extreme care to prevent damage to trees, flowers, shrubs, etc. Bear all costs of replacing or repairing trees, shrubs, flowers, etc.
- H. Replace or re-erect all fences and guard rails taken down or disturbed to the satisfaction of the ENGINEER, at no additional cost to OWNER.
- I. Conduct work in a manner to properly protect all other utility facilities, such as gas mains, telephone and power conduits and poles, sewers, drainage, cable, fiber optics and other similar facilities. Work near these facilities in accordance with the utility's requirements, rules and regulations. If any utility is damaged, immediately notify the utility involved so that proper inspection and repair can be made.

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- J. The OWNER or ENGINEER will attempt to notify the CONTRACTOR of any hazardous condition during non-working hours by telephone. If the OWNER or ENGINEER is unable to reach the CONTRACTOR or the CONTRACTOR fails to correct the hazardous condition utilizing all necessary safety devices within one (1) hour after notification, the OWNER will make all necessary repairs at the expense of the CONTRACTOR. If the hazardous condition is of such a nature, in the opinion of the ENGINEER, that it should be remedied immediately and the CONTRACTOR is unable or refuses to do so, the OWNER will make all necessary repairs at the expense of the CONTRACTOR.

1.04 NOTICE TO PROPERTY OWNERS

- A. Notify property owners at least one (1) day advance of pending construction. Keep driveways open and in good conditions at all times.

1.05 WORK WITHIN HIGHWAY RIGHTS-OF-WAY

- A. Perform and complete all work in State, County and Town rights-of-ways to the full satisfaction of the various Departments of Public Works concerned. Obtain all permits required.
- B. Conduct operations associated with the Work so as not to interfere with the movement of traffic on highways and with the operations of the particular Department of Public Works.
- C. If at any time during the work, traffic or facilities of the State of New York, County of Albany, or Town are endangered, immediately do such work as the representative of the particular Department of Public Works concerned may direct to restore safety. Bear all expenses of restoring safety based on the directions of the particular Department of Public Works representative, at no additional cost to the OWNER.
- D. Permit inspection by the State of New York, County of Albany, or Town at all times as the work progresses.
- E. Give written notice to the State of New York, County of Albany, or the Town five (5) days before work begins within their right-of-way.

1.06 WORK WITHIN AGRICULTURAL LANDS

- A. Do not remove topsoil from the agricultural lands without the written approval of the landowner and the ENGINEER.
- B. Avoid compaction of agricultural soil through all phases of the Work.
- C. Avoid soil erosion, sediment pollution, and overall agricultural land profile disfigurement.
- D. Constantly maintain all natural and man-made surface drainage systems in a functional state.
- E. Protect subsurface drainage systems at all times.
- F. Employ the double-ditching technique to separate topsoil and subsoil for excavation of pipeline trenches.
- G. Backfill in a manner to return the spoils to the natural soil profile.
- H. Remove rocks 10" or larger from actively farmed areas.

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CARE AND PROTECTION OF PROPERTY

1.07 WORK WITHIN WETLANDS AND WETLAND BUFFER ZONES

- A. The OWNER will obtain all necessary permits for working within wetlands and wetland buffer zones.
- B. The CONTRACTOR shall adhere to all of the requirements of the permits.
- C. No refueling, oiling, or greasing of construction equipment is allowed in the Wetland or New York State Wetland Buffer Zone.
- E. In the event of spillage of petroleum products within the Wetlands or Wetlands Buffer Zone, take prompt remedial action to stop, contain and remove any spilled materials.
- F. Remove excess spoils, in their entirety, off-site in an amount proportionate to the volume of the pipe and any bedding material installed. Maintain the original bottom contour surface elevations.

END OF SECTION

SECTION 01300
SUBMITTALS

PART 1. GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Submittal procedures
 - 2. Construction progress schedules
 - 3. Proposed product list
 - 4. Shop Drawings
 - 5. Samples
 - 6. Manufacturer's instructions
 - 7. Manufacturer's certificates
 - 8. Construction photographs

1.02 RELATED SECTIONS

- A. GENERAL CONDITIONS
- B. All Sections specifying materials

1.03 SUBMITTAL PROCEDURES

- A. Transmit each submittal with a cover sheet with transmittal form.
- B. Sequentially number each transmittal form. Resubmittals shall reference original number with an alphabetic extension. Example: Shop drawing 101. The resubmittal would be labeled Shop Drawing 101a.
- C. Each transmittal form shall include the following:
 - 1. Project Name
 - 2. Project number
 - 3. Contract number
 - 4. CONTRACTOR's name
 - 5. Subcontractor's name
 - 6. Supplier's name

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7. Applicable specification section(s)
 8. Applicable Contract Drawing sheet number(s) and Detail name(s)
 9. Deviations; if none state or list all deviations
 10. Space requirements - list all deviations or indicate differences from design
- D. Apply the CONTRACTOR'S stamp certifying that the review, verification of products, field dimensions, and coordination of information is in accordance with the Contract Documents. The CONTRACTOR shall sign and certify each submittal and state that the CONTRACTOR has reviewed and verified all requirements of the Contract Documents and that the proposed material meets all requirements set forth in the Contract Documents.
- E. Schedule Submittals to expedite the project and deliver to the ENGINEER at the indicated business address.
- F. Identify any deviations from the Contract Documents and Product or system limitations which may be detrimental to the successful completion of the indicated work. Identify space requirements which differ from those designed, shown or indicated in the Contract Documents.
- G. Provide space for the ENGINEER's stamp.
- H. Revise and resubmit submittals as required, identify all changes made since previous submittals. Large submittals containing many errors will not be reviewed but will be returned to the contractor with only a part of the errors noted with the instruction to revise and resubmit the entire submittal.
- I. Submittals or information not requested will not be reviewed or recognized. All materials will be returned to the CONTRACTOR unreviewed.

1.04 PROPOSED PRODUCTS LIST

- A. Within 10 days after the Notice to Proceed, submit a complete list of major products proposed for use, with the name of manufacturer, trade name, and model number of each product and appropriate Specification Section number. Provide a schedule of submittals within 30 days of Notice to Proceed.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and referenced standard.

1.05 SHOP DRAWINGS

- A. Submit six (6) hard copies and one (1) electronic copy to the ENGINEER. Two hard copies will be retained by the ENGINEER.
- B. After review by the ENGINEER, distribute copies in accordance with procedure described and for Record Documents described.

1.06 MANUFACTURER'S INSTRUCTIONS

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SUBMITTALS

- A. When specified in individual specification sections, submit the printed manufacturer's instructions for delivery, storage, assembly, installation, adjusting, and finishing, in quantities specified for product data.
- B. When specified in individual specification sections, submit manufacturer's operation and maintenance instructions for equipment supplied for this project. Manuals shall be delivered prior to 75 percent completion of the project.

1.07 MANUFACTURER'S CERTIFICATES

- A. When specified in individual specification sections, submit manufacturer's certificate to ENGINEER for review, in quantities specified for Product Data.
- B. Indicate that material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or product, but must be approved by the ENGINEER.
- D. When specified in individual specification sections, submit manufacturer's performance affidavits for equipment to be furnished for this project. Affidavits shall be of the format and content prescribed and shall be included with the specification section shop drawing.

PART 2. PRODUCTS

Not used.

PART 3. EXECUTION

Not used.

END OF SECTION

SECTION 01305
CONSTRUCTION SEQUENCING

PART 1 GENERAL

1.1 WORK INCLUDED

- A. All Wastewater Pump Stations will continue to operate during execution of this Contract 24 hours per day, 7 days per week. Normal operating hours for the administration areas is 8:00 AM to 4:00 PM.
- B. Demolition of existing facilities and construction of new facilities must be scheduled so as not to interrupt to pumping operations. Pumping operations includes all processes, equipment, conveying systems, power and controls necessary to maintain compliance with the facility's SPDES permit.
- C. Coordination between the all prime contractors and their sub-contractors is a requirement of this project. This coordination is necessary in several areas to insure uninterrupted operations of the stations. All contractors shall coordinate scheduling through the Engineer and Owner.
- D. Except where specifically noted below, prime contractors are responsible for providing all temporary facilities required to maintain plant operation during the execution of this contract. The prime contractors shall provide a detailed construction sequence plan, including a schedule, covering the specific work tasks described below and any and all other tasks that may affect pump station operations to the engineer prior to starting any work on this project.
- E. All contractors will be required to attend weekly construction meetings to discuss and resolve critical items.
- F. The Contractor shall provide the Engineer with a minimum of 1 week notice of their intent to place any new structure or piece of equipment into operation.
- G. No equipment shall be placed into temporary or permanent operation without prior approval of the Engineer. All equipment shall be placed into operation in the presence of a manufacturers' designated representative.
- H. The Contractor shall include sufficient time in all construction sequencing to properly clean existing structures prior to initiating work.
- I. The Contractor for Contract # 2021-05 shall be responsible for preparation of an overall construction schedule. The schedule shall allow for sufficient time to complete all tasks required by each Prime Contractor and their subcontractors. The schedule will be reviewed by all Prime Contractors for verification of sufficient time to complete all tasks. The schedule will be subject to the approval of the Owner and Engineer and shall meet all the time frames outlined in the contract documents.

1.2 SAW MILL PUMP STATION SEQUENCING

- A. The following is a suggested overview of the installation of new pumps and controls at the Saw Mill Pump Station. A minimum of three (3) pumps need to be running at all times during construction. Please note that this is not intended to be a complete list but only to serve as a guideline for establishing a basis for maintaining (3) pumps in operations at all times.
 - 1. Shutdown Wetwell #2 and clean wetwell.
 - 2. Repair Wetwell #2.
 - 3. Install new gates and grinder.
 - 4. Install new Generator, Automatic Transfer Switch, and associated gear..
 - 5. Install new VFD and feeder for pump in position #4,#5,& #6.
 - 6. Install new pumps while old pumps are still operational.
 - 7. Install new electrical service.
 - 8. Install piping to a point where connection can easily be made to new crosses in header associated with pump #4, #5, & #6 header piping.(not yet installed).

SECTION 01305
CONSTRUCTION SEQUENCING

- At this point three old pumps still running on old controls and through old piping -
9. Begin Bypass.
 10. Begin demolishing old pump #1, #2, & #3 and associated piping
 11. Install new pump #1, #2, #3.
 12. Install new VFD and feeder for new pump in position #1, #2, #3
 13. Install New Control Panel program and upgrades.
 14. Install new level controllers.
 15. Decommission bypass pumping, and utilize existing pumps.
 16. Disconnect and remove existing MCC.

PART 2 PRODUCTS
Not Used

PART 3 EXECUTION
Not Used

END OF SECTION

SECTION 01560
PROTECTION OF THE ENVIRONMENT

PART 1 GENERAL

1.01 SUMMARY

- A. CONTRACTOR, in executing Work, shall maintain Work areas on- and off-site free from environmental pollution that would be in violation of federal, state or local regulations.
- B. CONTRACTOR is required to sign and submit ENGINEER's SWPPP to the OWNER and ENGINEER to file, when applicable.

1.02 PROTECTION OF STORM SEWERS

- A. Prevent construction material, pavement, concrete, earth or other debris from entering existing storm sewer or sewer structure.

1.03 PROTECTION OF WATERWAYS

- A. Observe rules and regulations of the State of New York and agencies of U.S. government prohibiting pollution of lakes, streams, rivers or wetlands by dumping of refuse, rubbish, dredge material or debris.
- B. Disposal of materials into waters of state must conform to requirements of the State of New York and the U.S. Army Corps of Engineers. All permits will be obtained by CONTRACTOR, copies provided to the ENGINEER, and posted on the job site.
- C. Apply appropriate soil conservation measures to protect project area and adjacent lands. These measures may include, but not be limited to, mulching, rapid growth vegetation, fabric mat, filter barriers, sediment traps and basins.
- D. All work for this section shall be performed in strict accordance with "New York State Standards and Specifications for Erosion and Sediment Control", NYSDEC, August 2005 or most recent edition, (i.e., Standards). The Standards are incorporated herein by reference.
- E. Prepare and submit the following to ENGINEER:
 - 1. Limits of disturbance.
 - 2. Sequence of construction as it relates to installation, phasing, and removal of sediment control measures.
- F. Provide erosion control measures, in place, before commencing work on project site.
 - 1. Maintain erosion control measure during course of construction.
 - 2. Remove erosion control measures upon establishment of permanent, surface stabilization.
- G. Complete temporary or permanent stabilization of surface of perimeter controls, dikes, swales, ditches, perimeter slopes, and slopes greater than 3:1 within 7 calendar days following initial soil disturbance. Stabilize other disturbed or graded areas within 14 calendar days.

SECTION 01560
PROTECTION OF THE ENVIRONMENT

1.04 DISPOSAL OF EXCESS EXCAVATED AND OTHER WASTE MATERIALS

- A. Excess excavated material not required or suitable not for backfill and other waste material shall be disposed of in accordance with State and local regulatory requirements.
- B. Provide watertight conveyance for liquid, semi-liquid or saturated solids which tend to bleed during transport. Liquid loss from transported materials is not permitted, whether being delivered to construction site or hauled away for disposal. Fluid materials hauled for disposal must be specifically acceptable at selected disposal site.

1.05 PROTECTION OF AIR QUALITY

- A. Minimize air pollution by requiring use of properly operating combustion emission control devices on construction vehicles and equipment and encourage shutdown of motorized equipment not in use.
- B. Do not burn trash on construction site.
- C. If temporary heating devices are necessary for protection of Work, they shall not cause air pollution.

1.06 THAWING OF FROZEN GROUND

- A. Obtain permit from appropriate local authority before building fire to thaw frozen ground, and comply with conditions of permit.
- B. Use fuel which does not create air pollution or inconvenience public.
- C. ENGINEER reserves right to prohibit fires for thawing whenever deemed undesirable.

1.07 USE OF CHEMICALS

- A. Chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification, shall be approved by U.S. EPA or U.S. Department of Agriculture or any other applicable regulatory agency.
- B. Use and disposal of chemicals and residues shall comply manufacturer's instructions.

1.08 NOISE CONTROL

- A. Conduct operations to cause least annoyance to residents in vicinity of Work, and comply with applicable local ordinances.
- B. Equip compressors, hoists, and other apparatus with mechanical devices necessary to minimize noise and dust. Equip compressors with silencers on intake lines.
- C. Equip gasoline or oil-operated equipment with silencers or mufflers on intake and exhaust lines.

SECTION 01560
PROTECTION OF THE ENVIRONMENT

- D. Line storage bins and hoppers with material that will deaden sounds.
- E. Conduct operation of dumping rock and of carrying rock away in trucks so as to cause minimum of noise and dust.
- F. Route vehicles carrying rock, concrete or other material over such streets as will cause least annoyance to public and do not operate on public streets between hours of 6:00 p.m. and 7:00 a.m., or on Saturdays, Sundays or legal holidays unless approved by ENGINEER.

1.09 DUST CONTROL

- A. Due to close geographic location of Project to other off-site facilities and residential homes, take special care in providing and maintaining temporary site roadways, OWNER'S existing roads, and public roads used during construction operations in clean, dust free condition.
- B. Comply with state and local environmental regulations for dust control. If CONTRACTOR'S dust control measures are considered inadequate by ENGINEER, ENGINEER may require CONTRACTOR to take additional dust control measures.
- C. The use of calcium chloride is prohibited.

1.10 FUELS AND LUBRICANTS

- A. Comply with local, state and federal regulations concerning transportation and storage of fuels and lubricants.
- B. Fuel storage area and fuel equipment shall be approved by OWNER prior to installation. Submit containment provisions to OWNER for approval.
- C. Keep motorized equipment in good working order with no fuel or lubricant leakage. In the event of a leak, protect ground surface from leakage using tarps or other methods, and immediately remove leaking equipment or make repairs. Report spills or leaks from fueling equipment or construction equipment to OWNER and cleanup as required.
- D. OWNER may require CONTRACTOR to remove damaged or leaking equipment from Project site.
- E. Refueling, lubrication, and any other maintenance of equipment shall not be performed in or near any streams or wetland areas. Maintenance tasks shall be conducted at an upland staging area at least 100 feet away from any waters or wetlands. The CONTRACTOR shall have spill-kits on site at all times.

PART 2 PRODUCTS

2.01 (Not Used)

PART 3 EXECUTION

3.01 (Not Used)

END OF SECTION

SECTION 01600
MATERIALS AND EQUIPMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Products.
- B. Transportation and handling.
- C. Storage and protection.
- D. Product options.
- E. Substitutions.

1.2 RELATED SECTIONS

- A. Section 01560 – Protection of Environment

1.3 PRODUCTS

- A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.
- B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
- C. Provide interchangeable components of the same manufacturer, for similar components.

1.4 TRANSPORTATION AND HANDLING

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.5 STORAGE AND PROTECTION

- A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate controlled enclosures.
- B. For exterior storage of fabricated products, place on sloped supports, above ground.
- C. Provide off-site storage and protection when site does not permit on-site storage or protection.
- D. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.
- E. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- F. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- G. Arrange storage of products to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.

SECTION 01600
MATERIALS AND EQUIPMENTS

1.6 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

1.7 SUBSTITUTIONS

- A. Engineer will consider requests for Substitutions only within 15 days after date established in Notice to Proceed.
- B. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.
- C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
- D. A request 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. Will provide the same warranty for the Substitution as for the specified product.
 - 3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension which may subsequently become apparent.
 - 5. Will reimburse Owner for review or redesign services associated with re-approval by authorities.
- E. 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.
- F. Substitution Submittal Procedure:
 - 1. Submit five (5) copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
 - 2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence.
 - 3. The Engineer will notify Contractor, in writing, of decision to accept or reject request.

END OF SECTION 01600

SECTION 01650
STARTING OF SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Starting systems.
- B. Demonstration and instructions.
- C. Testing, adjusting, and balancing.

1.2 RELATED TOPICS

- A. Quality Control: Manufacturers field reports.
- B. Contract Closeout: System operation and maintenance data and extra materials.

1.3 STARTING SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Engineer seven (7) days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or for other conditions which may cause damage.
- D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable manufacturer's representative and/or Contractors' personnel (as specified in individual Sections) in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report indicating that equipment or system has been properly installed and is functioning correctly.

1.4 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to Owner's personnel two (2) weeks prior to date of Substantial Completion.
- B. Demonstrate project equipment and instruct in a classroom environment located at the site and instructed by a qualified manufacturers' representative who is knowledgeable about the project.
- C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.
- D. Demonstrate start-up, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at equipment location.
- E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- F. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.
- G. The Owner reserves the right to videotape any of the demonstrations or instructions provided under this section.

SECTION 01650
STARTING OF SYSTEMS

1.5 TESTING, ADJUSTING, AND BALANCING

- A. Appoint, employ, and pay for services of an independent firm to perform testing, adjusting, and balancing.
- B. Reports will be submitted by the independent firm to the Engineer indicating observations and results of tests and indicating compliance or non-compliance with the requirements of the Contract Documents.

PART 2 PRODUCTS
Not Used

PART 3 EXECUTION
Not Used

END OF SECTION

SECTION 01700
CONTRACT CLOSEOUT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Closeout procedures.
- B. Final cleaning.
- C. Adjusting.
- D. Project record documents.
- E. Operation and maintenance data.
- F. Warranties.
- G. Spare parts and maintenance materials.

1.2 RELATED SECTIONS

- A. Section 01027 – Application for Payment

1.3 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Engineer's inspection.
- B. Provide submittals to Engineer that are required by governing or other authorities.
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.4 FINAL CLEANING

- A. Execute final cleaning prior to final inspection.
- B. Clean equipment and fixtures to a sanitary condition.
- C. Clean areas and remove waste and surplus materials, rubbish, and construction facilities from the site.

1.5 ADJUSTING

- A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.6 PROJECT RECORD DOCUMENTS

- A. Maintain on site, one set of the following record documents; record actual revisions to the Work:
 - 1. Contract Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other Modifications to the Contract.
 - 5. Reviewed shop drawings, product data, and samples.
- B. Store Record Documents separate from documents used for construction.
- C. Record information concurrent with construction progress.
- D. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and Modifications.

SECTION 01700
CONTRACT CLOSEOUT

- E. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Field changes of dimension and detail.
 - 2. Details not on original Contract Drawings.

1.7 WARRANTIES

- A. Provide duplicate notarized copies.
- B. Execute and assemble documents from Subcontractors, suppliers, and manufacturers.
- C. Provide Table of Contents and assemble in three D side ring binder with durable plastic cover.
- D. Submit prior to final Application for Payment.
- E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

1.8 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification Sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 02100
SITE PREPARATION - CLEARING, GRUBBING, AND TOPSOIL REMOVAL

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The CONTRACTOR shall furnish all labor, materials, tools, supervision, transportation, installation equipment, and incidentals necessary to complete the work specified herein and shown on the Drawings. The work shall include, but not be limited to:
 - 1. Clearing and grubbing the limits shown on the Drawings of trees, tree roots, brush, and incidental debris in the limits required for construction;
 - 2. Chipping all cleared brush and small trees;
 - 3. Stripping topsoil from work areas;
 - 4. Transporting the topsoil to stockpiles at locations approved by the OWNER; and
 - 5. Stabilizing the topsoil stockpiles.

1.02 DEFINITIONS

- A. Structures and Surface Features: Existing structures and surface features including signs, posts, fences, trees, shrubs, landscaped surface features, and other miscellaneous items.
- B. Utilities: Existing gas mains, water mains, steam lines, electric lines and conduits, telephone and other communication lines and conduits, sewer pipe, cable television, other utilities, and appurtenances.
- C. Clearing and Grubbing: Cutting and disposing of trees, brush, windfalls, logs, and other vegetation, and removing and disposing of roots, stumps, stubs, grubs, logs, and other timber.
- D. Salvaged Topsoil: Natural loam, sandy loam, silt loam, silty clay loam, or clay loam humus-bearing soils available from overlying portions of areas to be excavated for construction.
- E. Hard Fill: Crushed concrete, block, brick and inert materials resulting from demolition. Hard fill does not include wood, gypsum wall board, or putrescible material of any type.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Materials to be cleared and grubbed include trees, roots, shrubs, and any debris or other foreign matter that is neither topsoil nor suitable for backfill, as determined by the Engineer.
- B. Topsoil shall be that of surface material consisting of organic soils that typically occurs at the site to a depth of approximately 4 inches beneath ground surface.
- C. Seed, mulch and erosion control measures shall be as specified in Sections 01560, 02925 and 02931.

SECTION 02100
SITE PREPARATION - CLEARING, GRUBBING, AND TOPSOIL REMOVAL

PART 3 EXECUTION

3.01 PREPARATION

- A. Provide three (3) working days notice to owners of existing utilities, structures, and surface features prior to beginning construction.
- B. Provide protection and support during construction for existing utilities, structures, and surface features.
- C. Remove obstructions such as mounds of dirt, stone or debris located within limits of construction. Obstructions such as culverts, end walls, signs, fencing, etc., may be removed if replaced when need for removal is completed. Replace to original condition.

3.02 CLEARING AND GRUBBING

- A. Clearing and grubbing shall only be performed in areas identified within the limits of disturbance on the Drawings and as directed and approved by the OWNER. Appropriate erosion and sedimentation controls shall be in place before the start of clearing, as described in Section 02925 and 02931.
- B. Do not remove or cut down trees unless located within limits of excavation as indicated on Drawings. Obtain ENGINEER's approval for all shrubs and trees to be removed.
- C. Do not trim trees unless located within easements or rights-of-way shown on Drawings. Cut interfering tree roots and branches 1 in. or greater in diameter perpendicular to direction of growth on tree side of trench.
- D. If weather conditions are unsuitable for clearing and grubbing, as determined by the OWNER, CONTRACTOR shall cease operations until permission to resume operations is obtained from the OWNER.
- E. The CONTRACTOR shall clear and maintain all areas required for access to and execution of work.
- F. Grubbing shall consist of the removal and disposal of stumps, roots, and debris from the work area(s) as shown on the Drawings. The CONTRACTOR shall remove grubbed material from the site. Dispose of materials removed by clearing and grubbing in accordance with applicable Local, State and Federal regulations.
- G. The CONTRACTOR shall protect all existing structures and all utilities which are to remain. CONTRACTOR shall be liable for any and all damages caused by clearing and grubbing operations.

SECTION 02100
SITE PREPARATION - CLEARING, GRUBBING, AND TOPSOIL REMOVAL

3.03 TOPSOIL REMOVAL

- A. Topsoil may be removed from the areas within the limits of disturbance as indicated on the Drawings upon request by the CONTRACTOR and approval by the Engineer. The depth of topsoil removal shall be determined by CONTRACTOR conducted testing and evaluation of the soils encountered and approved by the Engineer.
- B. Before stripping or removing topsoil, the CONTRACTOR shall mow or otherwise remove all heavy grass, weeds, or other vegetation over areas from which topsoil is to be removed. The Engineer shall determine whether excessive vegetation is present prior to any stripping operations. Appropriate erosion and sedimentation controls shall be in place before the start of topsoil removal, as described in Section 01560, 02925 and 02931.
- C. Equipment and methods of operation employed shall be chosen with the intent of avoiding lifting subsoil or other unsuitable material.
- D. Strip stockpile areas of vegetation prior to stockpiling.
- E. Stripped topsoil shall be free from clay, stones, vegetation, and debris.

3.04 TOPSOIL STOCKPILING

- A. The CONTRACTOR shall keep topsoil separate from other excavated materials. Topsoil shall be completely removed to the required depth from the designated area before beginning excavation or fill placement work in the area. Topsoil shall not be removed to a depth greater than directed by the Engineer.
- B. Topsoil shall be stockpiled on well drained land in an area identified by CONTRACTOR and acceptable to the OWNER. Topsoil shall be placed in stockpiles of neat conformations and having side slopes no steeper than 4H:1V. The surface of each topsoil stockpile shall be shaped and tracked at the end of each working day.
- C. The topsoil stockpiles shall be isolated by surrounding them with silt fence.

3.06 EXCESS MATERIAL

- A. The CONTRACTOR shall at the CONTRACTOR's expense:
 - 1. Stockpile excavated material suitable for backfill on site.
 - 2. Place material as ordered by ENGINEER on-site.
 - 3. Remove material not required by OWNER from the Site and provide for proper disposal meeting all Local, State, and Federal regulations.

END OF SECTION

SECTION 02200
EARTHWORK

PART 1 GENERAL

1.01 SUMMARY

Section Includes

- A. Excavating
- B. Preparing Subgrade for Fill, Foundations, Pavement
- C. Placing and Compacting Soil and Aggregate Fill, Drainage Course, Subbase, Base
- D. Backfilling at Structures, Utilities and Appurtenances
- E. Grading

1.02 Related Sections

- A. 02100 Site Preparation
- B. 02925 Soil Erosion and Sediment Control
- C. 02221 Trenching and Excavation
- D. 02610 Pipeline Installation
- E. 02950 Dewatering
- F. 03300 Cast In Place Concrete

1.03 REFERENCES

ASTM (American Society for Testing and Materials)

- A. D 422 Particle Size Analysis for Soils
- B. D 698 Laboratory Compaction Characteristics of Soil Using Standard Effort D 1241 Specification for Soil-Aggregate Subbase, Base and Surface Courses
- C. D 2216 Moisture Content of Soil and Rock
- D. D 2487 Classification of Soils for Engineering Purposes
- E. D 2922 Density of Soil and Soil-Aggregate In Place by Nuclear Methods
- F. D 2940 Graded Aggregate Material for Bases or Subbases for Highways or Airports
- G. D 3017 Water Content of Soil and Rock In Place by Nuclear Methods
- F. E 1643 Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs

OSHA (Occupational Safety and Health Administration)

- A. 29 CFR Part 1926

1.04 DEFINITIONS

- A. *Additional Excavation* is the removal and disposal of material encountered below the Subgrade elevation indicated on the Drawings as authorized in writing by the Engineer.

SECTION 02200 EARTHWORK

- B. *Excavation* is the removal and disposal of material encountered above the Subgrade elevation indicated on the Drawings. Excavation also includes removal and disposal of hard, compacted or cemented material down to eight inches below the Subgrade Elevation indicated on the Drawings if required in the judgment of the Engineer. The removal and disposal of hard, compacted or cemented material will be considered rock excavation if the material is rock as defined in section 02224 and this section.
- C. *Fill* is Soil and Aggregate Material placed according to these Specifications to raise the subgrade elevation to the elevation indicated on the Drawings.
- D. *Maximum Density* is the maximum dry density determined by ASTM D 698.
- E. *Optimum Moisture Content* is the moisture content that corresponds to the Maximum Density.
- F. *Rock* is all hard, compacted or cemented material that in the judgment of the Engineer requires blasting or cannot be ripped using a Cat 330 with a heavy-duty, single-tooth ripping attachment.
- G. *Structure* is any building, foundation, slab, curb, utility or appurtenance permanently installed above or below the ground surface.
- H. *Subgrade* is the undisturbed earth or compacted fill immediately below the drainage course, subbase, or topsoil.
- I. *Unauthorized Excavation* is the removal or disposal of any material other than Excavation or Additional Excavation.
- J. *Unsuitable* is material that does not comply with these specifications.

1.05 SUBMITTALS

- A. Test Reports
 - 1. Classification of Soil and Aggregate Materials for each specified purpose
 - 2. Compaction Characteristics of Soil and Aggregate Materials for use as Fill
 - 3. In Place Density Determinations for Fill
- B. Project Record Documents
 - 1. Plan drawing of final Subgrade and buried Structure elevations

1.06 QUALITY ASSURANCE

- A. Qualifications
 - 1. Subject to Engineer approval
- B. Regulatory Requirements
 - 1. Notify potential owners of Underground Utilities of Excavation Schedule at least three days prior to initial Earthwork or earlier if required by law.
 - 2. Perform all Excavation in accordance with Department of Labor, Occupational Health and Safety Administration Standards for Excavation - 29 CFR 1926

SECTION 02200
EARTHWORK

C. Pre-Installation Conference

1. Coordinate with the Engineer at least one week prior to the initial Earthwork to confirm the receipt of Material samples and to present a schedule of Earthwork.

1.07 PROJECT/SITE CONDITIONS

A. Environmental Requirements

1. Perform Earthwork only when air temperature is above 28°F.
2. Perform Earthwork only when moisture conditions allow compliance with these specifications and do not promote deterioration of Subgrade or completed Work.
3. Perform Earthwork only during the hours from sunrise to sunset except as otherwise specified in writing by the Engineer
4. Perform Earthwork only when wind conditions do not cause Soil or Aggregate dust to leave the site of the Work.

B. Existing Conditions

1. Review the geotechnical exploration of the site.
2. Promptly and before such conditions are disturbed, notify the Owner in writing of subsurface or latent physical conditions at the site differing from those indicated in this contract, or unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent work of the character provided for in this contract. The Owner shall investigate the conditions, and if he finds that such conditions do materially so differ and cause an increase or decrease in the contractor's cost of, or the time required for, performance of any of the work under this contract, whether or not as a result of those conditions, an equitable adjustment shall be made and the contract modified in writing accordingly. No claim of the contractor under this clause shall be allowed unless the contractor has given the notice required above. No claim by the contractor for an equitable adjustment shall be allowed if ascertained after final payment under this contract.

C. Field Measurements

1. Survey cross-sections prior to and following the completion of Work Items to compute any rock excavation quantities. (Load counts, Weight tickets or other material quantity estimates not based on surveyed cross sections will not be accepted as evidence of rock excavation quantities.) Survey cross-sections for general excavation shall be submitted for records, however, the quantity of these excavations are included as a lump sum item and will not affect the Contract Price.

SECTION 02200
EARTHWORK

PART 2 PRODUCTS

2.01 MATERIALS

- B. Provide Soil and Aggregate Materials as defined in Section 02221

2.02 EQUIPMENT

- A. Provide operable Compaction Equipment (for areas 15 feet or more wide) prior to the initial Earthwork:
1. of the vibratory smooth steel drum type (for GW or SW soils) or the vibratory steel pad foot drum type (for GP, GM, SP or SM) or the sheeps foot or wobble wheel type for (CL, ML, CH, MH, GC, or SC soils) manufactured for the purpose of compacting soil and aggregate of the characteristics of the Soil or Aggregate being used
 2. of static weight of at least twenty five tons
 3. capable of achieving the specified densities within six passes
- B. Provide operable Compaction Equipment (for areas less than 15 feet wide including utility trenches and structure backfill zones) at times when adjacent wider zones of fill are being compacted so that the narrow zones can be compacted simultaneously where practical. Compaction Equipment must be suitable to the Soil and Aggregate being used.
- C. Provide operable Moisture Conditioning Equipment prior to the initial Earthwork that:
1. includes a trailer or vehicle mounted tank and spray arm
 2. includes a means of delivering potable water to the site
 3. includes a disc harrow, spring-tooth harrow or other equipment with similar capability to loosen and aerate soil and aggregate

2.03 SOURCE QUALITY CONTROL

- A. Provide submittals and testing of every proposed soil as required in Section 02221

PART 3 EXECUTION

3.01 EXCAVATION

- A. Excavate Soil to the Subgrade Elevation indicated on the Drawings after clearing, grubbing and stripping topsoil.

3.02 PREPARATION FOR STRUCTURES AND FILL

- A. Protect structure foundation area from disturbance by heavy equipment traffic.
- B. Establish temporary surface drainage improvements in conjunction with Erosion and Sediment Control Measures so that work areas do not impound water.

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EARTHWORK

- C. Proof roll subgrade after clearing, grubbing and stripping topsoil and before placing any fill using a completely loaded dump truck, or a fully ballasted rubber tired proof roller weighing at least 25 tons.
- D. Proof roll in two perpendicular directions using two complete overlapping coverages of each part of the surface to receive a Structure or Fill.
- E. Proof roll only under the observation of the Engineer or the representative designated by the Engineer.
- F. Over-excavate any weak, soft or otherwise unsuitable areas that, in the sole judgment of the Engineer, do not adequately withstand proof rolling until adequate subgrade is achieved.

3.03 FILL PLACEMENT AND COMPACTION

- A. Bench existing slopes steeper than one vertical to four horizontal so that nearly horizontal benches at least six inches deep at the cut side are created.
- B. Scarify to a depth of at least six inches, moisture condition and recompact all existing surfaces to receive fill except as otherwise specified in writing by the Engineer.
- C. Spread fill in nearly horizontal lifts no more than eight inches thick, loose measure (four inches maximum lift thickness for fill and backfill in confined areas to be compacted using equipment smaller than specified for areas 15 feet or more wide under section 2.02 A).
- D. Moisture Condition the fill so that its actual moisture content is within two percentage points of the Optimum Moisture content.
- E. Compact each lift of fill Material using at least three and as many additional complete, overlapping coverages by the Compaction Equipment as necessary to achieve an actual dry density of at least 98 percent of the (Standard Proctor) Maximum Dry Density.
- F. Operate Compaction Equipment at a speed no greater than a slow walk and otherwise in accordance with the manufacturers' recommendations for the characteristics of the Soil or Aggregate being used.
- G. Cooperate with the Engineer as he observes the compaction process and performs in place density tests to measure the in place density of each compacted lift at a frequency of approximately one test per 2,000 square feet of surface area.
- H. Scarify, moisture condition and recompact any zone of any lift that does not exhibit a density at least equal to that specified.
- I. Place succeeding lifts, following these Specifications, only after the entire lift exhibits at least the specified density.
- J. Remove and replace or scarify, moisture condition and recompact all fill which experiences saturation, desiccation, freezing or deterioration due to traffic.
- K. Use alternative material or placement and compaction procedures if the fill is unstable, weaves under the tires or tracks of construction equipment or exhibits characteristics that would reasonably be

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expected to cause poor performance of the fill or supported structures.

3.04 GRADING

- A. Place Fill to at least the elevation indicated on the Drawings.
- B. Trim all cut and compacted surfaces to within 0.05 feet of the elevation indicated on the Drawings.

3.05 BACKFILL

- A. Place Soil and Aggregate Materials for Backfill in lifts no less than three inches thick and no more than six inches thick, loose measure.
- B. Place backfill on both sides of footings, buried walls and utilities so that there is no more than an eight inch difference in fill height on opposite sides of the structure.
- C. Place backfill simultaneously with adjacent fill where practical to do so.
- D. Use Compaction Equipment specified for areas less than 15 feet wide to compact backfill within six feet of structures.

3.06 DRAINAGE COURSE, SUBBASE, BASE

- A. Place Soil and Aggregate Materials for Drainage Course, Subbase and Base in lifts no less than three inches thick and no more than six inches thick, loose measure.
- B. Compact Soil and Aggregate Materials for Drainage Course, Subbase and Base using six complete, overlapping passes of the Compaction Equipment specified for the width of the zone being compacted.
- C. Thoroughly moisten but do not saturate Base Material to receive Portland cement concrete footings, slabs and pavement immediately prior to concrete placement. Wherever a vapor barrier is used follow the requirements of the manufactures or at a minimum ASTM E 1643 for placement, protection, and repair of the vapor retarder (as needed).
- D. Notify the Engineer at least 24 hours prior to the placement of any concrete footings or slabs and obtain his acknowledgment that the surface is prepared to receive concrete.

3.07 COHESIVE FILL

- A. Place Soil Materials for Cohesive Fill in lifts no less than three inches thick and no more than six inches thick, loose measure. Place backfill on both sides of footings, buried walls and utilities so that there is no more than an eight inch difference in fill height on opposite sides of the structure
- B. Place Soil Materials for Cohesive Fill around storm water management facilities in lifts no greater than six inches loose measure.
- C. Compact each lift of Cohesive Fill Material using at least three and as many additional complete, overlapping coverages by the Compaction Equipment as necessary to achieve an actual dry density of

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at least 90 percent of the (Standard Proctor) Maximum Dry Density.

3.08 FIELD QUALITY CONTROL

- A. Control quality of Work in progress and completed Work.
- B. Owner will provide independent observation and testing services through Contract #5.
- C. Cooperate with independent observation and testing services.

3.09 PROTECTION

- A. Protect stockpiles from saturation by grading stockpile surfaces to drain and rolling those surfaces with a smooth drum roller, by covering stockpiles with plastic sheeting or other measures adequate to maintain the stockpiled material in a condition suitable for the intended use.
- B. Protect fills in progress from saturation by maintaining a positive slope on the fill surface and by rolling the fill surface with a smooth drum roller at the end of each day of operation and whenever precipitation is predicted.
- C. Protect footing Subgrade from saturation and physical disturbance by placing a lean concrete mudmat if adverse weather conditions are likely to occur. Note that this measure may not protect Subgrade from deterioration due to freezing.

END OF SECTION

SECTION 02220
DEMOLITION

PART 1 GENERAL

1.01 SUMMARY

- A. Contractor shall provide all labor, materials, equipment, supervision, tools, testing, permits, notifications and associated fees necessary to safely demolish the designated buildings, contents and existing underground structures and to properly remove and dispose of the debris in accordance with all relevant local, state and federal regulations and project requirements.

1.02 SUBMITTALS

- A. Quality Control Submittals:
 - 1. Permits: Submit one copy of each permit.
 - 2. Demolition Plan: Submit one copy of the demolition plan required under Quality Assurance Article.

1.03 QUALITY ASSURANCE

- A. Permits: Before the Work of this Section is started, obtain all permits required by Federal, state, and local jurisdictions for all phases and operations of the Work.
- B. Demolition Plan: Before the Work of this Section is started, prepare a detailed demolition plan for approval by Owner. The demolition plan shall include, but not be limited to, detailed outline of intended demolition procedures including methodology to ensure that any recyclables or material destined for a C&D landfill are segregated from materials designated for disposal at a RCRA Subtitle D landfill and to ensure that other neighboring structures, homes and public health is protected. The demolition plan will not relieve the Contractor of complete responsibility for the successful performance of the Work in accordance with all applicable Federal, State, and local codes and restrictions.
- C. Disposal and/or Recycling Facilities: All proposed recycling facilities and disposal facilities shall be pre-approved by the OWNER.

1.04 EXISTING CONDITIONS

- A. Asbestos: Abandonment of asbestos pipe is included within the scope of work and shall be handled in accordance with Section 02820 of the specifications. Asbestos pipe shall also be handled in accordance with all local, state and federal regulations at no additional cost to the Owner. Copies of all manifests shall be provided to the Owner within 24 hours of disposal, when offsite disposal is required.

1.05 CONTRACT LIMIT

- A. Contractor is to restrict work to within the Contract Limits as shown on the drawings, unless otherwise authorized by the Owner.
- B. All demolition, processing and loading of the debris is to occur within the contract limits, unless otherwise authorized by the Owner.

SECTION 02220
DEMOLITION

1.06 DISPOSAL

- A. All disposal facilities shall be pre-approved by the OWNER prior to commencing work.
- B. Contractor shall provide documentation of the tonnage of material disposed off-site at all recycling and disposal facilities within 24-hours of disposal. This documentation shall be in the form of tickets from a certified weigh station or landfill scale.

1.07 HEALTH AND SAFETY

- A. The Contractor shall take all necessary measures to protect workers and the public from illness and disease associated with exposure to demolition debris. This includes exposure to dust, volatile organic vapors, bacteria and fungal spores. Measures to be taken include but are not limited to the use of respiratory protection, disinfectants, and water spray.
- B. Air Monitoring: The contractor shall comply with the any regulatory Air Monitoring Requirements that exist. The Contractor shall retain a certified laboratory as required to complete any regulatory required monitoring as part of the work required by this section. Laboratory shall conduct all monitoring and enforcement of the provisions of the plan.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 GENERAL

- A. Provide temporary protection facilities between the Owners site and neighboring properties as required to protect adjacent structures and public health and welfare.
- B. Repair damage to sidewalks and roadways.
- C. Arrange for the removal and disposal of any hazardous materials in accordance with applicable Federal and State regulations.
- D. Burial of demolition debris on-site is prohibited.
- E. Contractor shall maintain 24-hour vehicular access along adjacent public roads.
- F. Verify the location and status of all utilities within the property.
- G. Power, telephone and gas utilities shall be disconnected by the Contractor.
- H. Any other utilities encountered during the demolition not already disconnected shall be properly terminated by the Contractor.
- J. The Contractor shall take all necessary precautions to preclude the interruption of utility services to any off-site buildings.

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DEMOLITION

- K. Demolition activities are limited to the hours of 8:30 AM to 5:00 PM, Monday through Friday.
 - L. All surrounding areas, egress, pedestrian walkways and streets must be protected and maintained throughout project completion. Whenever the construction work zone involves a roadway or walkway presently used by vehicular or pedestrian traffic, the Contractor shall present to the Owner for approval, a traffic control plan. Contractor shall obtain County approval for the plan.
 - M. Provide protection for plant life designated to remain. Replace damaged plant life.
- 3.02 TRANSPORTATION AND DISPOSAL
- A. Remove demolition debris and excess fill from the property as soon as practicable.
 - B. Transport demolition debris and excess fill to pre-approved disposal facilities as soon as practicable.

END OF SECTION

SECTION 02221
TRENCHING & EXCAVATION

PART 1 GENERAL

1.01 SUMMARY

- A. The CONTRACTOR shall furnish all labor, materials, tools, supervision, transportation, and installation equipment to perform all trenching and excavation as well as backfill placement and compaction as specified herein, specified in Section 02220 and as shown on the Drawings. Work of this section includes, but is not necessarily limited to:
1. Trenching for the installation of sewer and water lines
 2. Trenching for the installation of sewer force main
 3. Trenching for the installation of culverts
 4. Trenching for the installation of electrical and instrumentation conduit
 5. Excavation for the installation of all cast-in-place and pre-cast structures
 6. Excavation of unsuitable material
- B. The CONTRACTOR shall also furnish all labor, materials, tools, supervision, transportation, and installation equipment for sheeting, shoring, and bracing, dewatering, maintenance of existing utilities, providing temporary water service, disposal of excess materials and clean up of the site.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM), and "Standard Specifications, Construction and Materials", New York State Department of Transportation, latest edition: January 2, 2002.

1.03 RELATED SECTIONS

- | | | |
|----|-------|-----------------------------------|
| A. | 02100 | Site Preparation |
| B. | 02925 | Soil Erosion and Sediment Control |
| C. | 02220 | Earthwork |
| D. | 02610 | Pipeline Installation |
| E. | 02950 | Dewatering |
| F. | 03300 | Cast-In-Place Concrete |

1.04 DEFINITIONS

- A. Unsuitable Material: Topsoil, peat, organic soils, and materials containing slag, cinders, foundry sand, debris, and rubble or soil with less than required bearing capacity as determined by ENGINEER.

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TRENCHING & EXCAVATION

B. Hard Material

1. Weathered rock, dense consolidated deposits, including conglomerate materials which are not included in definition of "rock" but which usually require use of heavy excavation equipment, ripper teeth or jack hammers for removal.
2. Material identified as having standard penetration resistance, as determined by ASTM D1586, between 60 and 600 blows/ft defined as "hard material".

C. Pipe Zone

1. Pipe Zone extends from the base of the trench excavation (a minimum of 6 inches below the bottom of the pipe) to a minimum elevation as shown on the Contract Drawings above the crown of the pipe.

1.05 QUALITY ASSURANCE

A. Testing:

1. Laboratory Testing

Testing shall be performed by the CONTRACTOR and at CONTRACTOR's expense by a third party soils testing laboratory approved by the ENGINEER. The CONTRACTOR shall collect and have tested (1) set of samples for each of the soil materials per the table below that summarizes testing requirements for each soil source. Testing methods are as follows:

- a. Standard Proctor Moisture-Density Relationship as described by ASTM D-698
- b. Sieve Analysis as described by ASTM D-422
- c. Freeze Thaw Analysis as described by NYS DOT Method 208

All tests shall be performed in accordance with this specification and shall be completed prior to use on site. Results should be submitted to the ENGINEER for approval 7 days prior to commencing work. The following table summarizes the required analyses for each of the soil materials.

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TRENCHING & EXCAVATION

Table 1. Aggregates

Aggregate Type	NYS DOT Requirements	ASTM D-698	ASTM D-422	NYS DOT Method 208	Intended Use (AOBE)
Select Granular Fill (Structural Fill)	NYS DOT 203-2 (C)	X	X	X	Trench backfill, tank subbase, pipe bedding, general backfill
Controlled Low Strength Material (Flowable Fill)	NYS DOT 204-2			X	Separation between buried piping AOB
Screened Gravel Type 4	NYS DOT 304-2 Type 4	X	X		Interior backfill below slabs
Crushed Stone # 2	NYS DOT 623.12 # 2		X	X	Drainage, pipe bedding, building and structure foundation
Crushed Stone # 1	NYS DOT 623.12 #1		X	X	Drainage, pipe bedding, building and structure foundation
Light stone fill	NYS DOT 620-2.02 - light		visual	X	Slope protection
Medium stone fill	NYS DOT 620-2.02 - medium		visual	X	Slope protection
Heavy stone fill	NYS DOT 620-2.03		visual	X	Slope protection
Subbase course Type RC-1	As described herein		X	X	Asphalt subbase beneath all local roads and driveways

Table 2. Gradation Requirements – Percentage by Weight Passing the following Square Openings

Aggregate Type	4" (100 mm)	3" (75 mm)	2- 1/2" (63 mm)	2" (50 mm)	1- 1/2" (37.5 mm)	1" (25 mm)	1/2" (12.5 mm)	1/4" (6.3 mm)	1/8" (3.2 mm)	No. 40 Sieve (425 µm)	No. 80 Sieve (180 µm)	No. 200 Sieve (75 µm)
Select Granular Fill	100	-	-	-	-	-	-	-	-	0-70	-	0-15
Screened Gravel Type 4	-	-	-	100	-	-	-	30-65	-	5-40	-	0-10
Crushed Stone # 2	-	-	-	-	100	90-100	0-15	-	-	-	-	0-1.0
Crushed Stone #1	-	-	-	-	-	100	90-100	0-15	-	-	-	0-1.0
Subbase Type RC-1	As described herein											

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Table 3. Stone Filling Gradation Requirements

Stone Filling Item	See Notes	Stone Size ¹	Percent of Total by Weight	For Contract
Fine	2, 3, 4	Smaller than 200 mm	90 - 100	N/A
		Larger than 75 mm	50 - 100	
		Smaller than 2.0 mm	0 - 10	
Light	2, 3, 4	Lighter than 50 kg	90 - 100	
		Larger than 150 mm	50 - 100	
		Smaller than 12 mm	0 - 10	
Medium	2, 4	Heavier than 50 kg	50 - 100	
		Smaller than 150 mm	0 - 10	
Heavy	2, 4, 5	Heavier than 300 kg	50 - 100	
		Smaller than 150 mm	0 - 10	

Notes:

1. Stone sizes, other than weights, refer to the average of the maximum and minimum dimensions of a stone particle as estimated by the engineer.
2. Materials shall contain less than 20 percent of stones with a ratio of maximum to minimum dimension greater than three.
3. Air-cooled blast furnace slag, cobbles, or gravel having at least one fractured face per particle are acceptable substitutes for stone under these items, provided that the soundness and gradation requirements are met.
4. Materials shall contain a sufficient amount of stone smaller than the average stone size to fill in the spaces between the larger stones.
5. Heavier gradings of this item may be required on some projects, in which case the requirements will be stated on the plans or in the proposal.

2. During Construction Testing

The OWNER (via Contract #5) will perform field quality assurance testing of all soil placement operations. Specifically, the OWNER will perform in place density and moisture testing using a nuclear density gauge as described by ASTM D-2922/3017. Density/moisture testing will be performed on Select Granular Fill, Subbase, Unclassified Backfill and Pipe Bedding materials at a frequency as required per this specification or as required by the ENGINEER in the field.

Additionally, the ENGINEER will perform visual inspections for gradation on the light and medium stone fills as well as for the rip rap.

Additional testing will be used at the discretion of the ENGINEER when visual observations indicate a change in the material or the construction performance. If a defective area is discovered, the ENGINEER will immediately determine the extent and nature of the defect. If the defect is indicated by an unsatisfactory test result, the ENGINEER will determine the extent of the defective area by additional tests, observations, a review of records, or other means that the ENGINEER deems appropriate. If the defect is related to adverse site conditions ENGINEER will define the limits of the defect and consult with the OWNER.

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3. Frequency

Laboratory Analysis:

- a. The CONTRACTOR shall collect and have tested (1) set of samples for each of the soil materials for each soil source.
- b. Additional sampling will be used at the discretion of the ENGINEER when visual observations indicate a change in the material or the construction performance.

During Construction (Moisture/Density Testing):

- a. One per 500 LF per lift for pipe bedding and select granular fill in pipe trenches
- b. One per 2,000 square feet area per lift (minimum one per test area)

B. Sheeting, Shoring, and Bracing:

1. Sheeting, shoring, and bracing shall be designed by a Professional ENGINEER registered in the State of New York.
2. Sheeting, shoring, and bracing shall conform to safety requirements of federal, state, or local public agency having jurisdiction over such matters. Most stringent of these requirements shall apply.

1.06 SUBMITTALS

- A. The CONTRACTOR shall submit the following information and samples to the ENGINEER a minimum of 14 days prior to starting construction of each soil component.
 1. The proposed material source.
 2. Laboratory test data in conformance with the requirements of Part 2.01.
 3. A 100-pound sample of the proposed stone material for the ENGINEER'S use.
- B. The CONTRACTOR shall notify the ENGINEER in writing a minimum of 7 days prior to starting construction of any soil component. The notice shall state the material to be used, the equipment to be used, the date and time that placement operations will start, the name of the person in the field who will be in charge of this construction.
- C. Shoring, Bracing, and Sheet Piling Construction Procedures and Details: If CONTRACTOR elects to use sheeting, shoring, or bracing, CONTRACTOR shall prepare a detailed shop drawing showing the sheeting, shoring, or bracing to be used. Sheeting, shoring, and bracing shall be designed and stamped by a Professional ENGINEER licensed in New York State. ENGINEER will review submitted material to ascertain effect on new construction. ENGINEER will not review shoring, bracing, and sheeting for structural integrity or effect on existing facilities.
- D. Submit in accordance with Submittals Section 01300, Supplemental General Requirements

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TRENCHING & EXCAVATION

1.07 PROJECT/SITE CONDITIONS

- A. Do not block or obstruct sidewalks or pavements with excavated materials, except as authorized by the ENGINEER. Trim banks to minimize inconvenience to public travel.
- B. Sheeting, Bracing, and Shoring:
 - 1. Sheeting, shoring, and bracing shall conform to safety requirements of federal, state, or local public agency having jurisdiction over such matters. Most stringent of these requirements shall apply.
 - 2. Sheeting, shoring, and bracing shall not affect structural integrity of new construction, water tightness or waterproofing of new construction, and shall allow for sufficient clearances necessary to install associated appurtenances adjacent to new construction.
 - 3. When close sheeting required, drive to prevent soil from entering trench below or through such sheeting.
 - 4. Fill voids remaining after sheeting pulled with sand or other approved material.
- C. Trenching, Backfilling, and compacting within influence zone of existing or future structures shall be in accordance with this Section.

PART 2 PRODUCTS

2.01 Aggregate and fill materials used in construction shall conform with the following requirements:

- A. Select Granular Fill - NYS DOT 203-2 – To be used as structural fill under structures and as pipe bedding
- B. Controlled Low Strength Material (CLSM) – NYS DOT 204-2 - To be utilized at pipe crossings AOB
- C. Screened Gravel Type 4 – NYS DOT 304-2 Type 4 – To be utilized as fill under interior slabs
- D. Crushed Stone # 2 – NYS DOT 623.12 # 2 – To be utilized for base underneath all structures and as pipe bedding
- E. Crushed Stone # 1 – NYS DOT 623.12 # 1 - To be utilized for base underneath all structures and as pipe bedding
- F. Light Stone Filling – NYS DOT 620.03
- G. Medium Stone Filling – NYS DOT 620.04
- H. Heavy Stone Filling – NYS DOT 620.05
- I. Subbase Course – Type RC-1
Maximum particle size is 1-1/4"; Minimum particle size is 3/4". A maximum of 8% by weight shall pass the #200 size sieve. It shall be used as a subbase beneath all municipal paving as shown on the plans. Referred to as "run-of-crusher", the material shall be

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TRENCHING & EXCAVATION

angular crusher run stone as delivered unsorted from the crusher. Unless stated otherwise in the Special Requirements, limestone material shall be used, and shall be well graded, durable and composed of rock pieces, chips and fines. The amount of fine material shall be sufficient to fill all voids between large stones when the material is compacted.

- J. Acceptable Earth Fill (Unclassified Earth Fill)
May be used upon approval from ENGINEER for fill in areas not under nor adjacent to structures, sidewalks or roadways: Acceptable Earth Fill may be excavated materials which are clean, consisting of earth, loam, sandy clay or other material approved by the ENGINEER in the field. Acceptable Earth Fill shall be free of large clods, pavement, broken pipe, concrete rubble or other debris, rock or boulders greater than 4" in diameter and soils containing vegetable or organic matter such as muck, peat, organic silt or any other deleterious matter.

2.02 GEOTEXTILE

- A. Non-Woven shall be Mirafi 140N or equal.
B. Woven shall be Mirafi 500X or equal

2.03 SHEETING, SHORING, AND BRACING

- A. Type, design, and installation of shoring, sheeting, and bracing shall be determined by and sole responsibility of CONTRACTOR.

PART 3 EXECUTION

3.01 PREPARATION

- A. CONTRACTOR shall locate all existing utilities and conduct exploratory excavations AOB to verify the location and elevations of existing utilities. Final submittals and pipe purchases shall not occur until this work is complete.
- B. CONTRACTOR shall layout the locations of all proposed structures and pipelines using stakes or paint, taking into account all existing utilities as determined from the utility verification process. Layout is subject to the approval of the ENGINEER. Final location of lines shall be verified at the time of construction by the ENGINEER.
- C. All equipment necessary and required for trenching, laying utility lines and appurtenances, backfilling, compaction and restoration shall be on the project before construction of this item shall be permitted to begin.
- D. CONTRACTOR shall provide timely notification in writing to all corporations, companies, individuals or authorities owning above or below ground conduits, wires, pipes or other utilities running to property or encountered during excavating operations.
- E. CONTRACTOR shall protect work in progress from unnecessary erosion or saturation. If CONTRACTOR's action or failure to act results in on-site materials becoming unacceptable for use, the CONTRACTOR shall remove unacceptable fills and provide acceptable fill as directed by the ENGINEER and at no cost to the OWNER.

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TRENCHING & EXCAVATION

- F. Cap or remove and relocate services as required by the Contract.
- G. Protect, support, and maintain conduits, wires, pipes, or other utilities that are to remain as required by OWNER.

3.02 EXAMINATION

- A. Proof-roll and examine subgrades and surfaces to receive fill within influence zone to determine existence of soft areas, areas loosened by frost action or softened by flooding, groundwater or weather or existence of unsuitable materials.
- B. Where sensitive soils are encountered, requirement for proof-rolling shall be waived, and CONTRACTOR shall perform alternate field testing to determine existence of soft areas.
- B. Compaction requirements shall be 95% of the maximum dry density as determined by ASTM D-698 Standard Proctor with the exception of areas which will be under any structures. All areas which will have structures installed shall be compacted to 98% of the maximum dry density and determined by ASTM D-698 Standard Proctor.
- C. Method of alternative testing shall be approved and coordinated with ENGINEER.
- D. Trench stabilization methods for trenching in soft soils are detailed in the Contract Drawings.

3.03 SHEETING, SHORING, AND BRACING

- A. Whenever necessary to prevent caving during excavation and to protect adjacent structures, property, workers, and public; excavations shall be sheeted, shored, and braced.
- B. Where sheeting, shoring, and bracing is required, drive/install to prevent soil from entering excavation below or through sheeting.
- C. Keep sheeting in-place until structure is placed, tested, and backfilled.
- D. Remove sheeting, shoring, and bracing in manner not damaging structure or permitting voids within backfill.
- E. Fill settled areas remaining after sheeting has been pulled with sand or other approved material.

3.04 FILL USAGE

- A. The types and minimum thickness of fill and bedding materials shall be as shown on the Contract Drawings.
- B. On-site cut soil may be utilized as fill (but not as structural fill) if soil meets the criteria as provided in Part 2 of this Specification and has an acceptable moisture content, and contains no deleterious materials as detailed in these specifications.

SECTION 02221
TRENCHING & EXCAVATION

3.05 SUBGRADE PREPARATION

- A. CONTRACTOR shall fill all settled areas where excavations or trenches were backfilled as well as holes made by demolition, tree removal, and site preparation work.
- B. Remove and replace or recompact natural soils or compacted fill softened by frost, flooding, groundwater or weather as designated by ENGINEER.
- C. Remove frozen soils within influence zone and replace with structural fill.
- D. All subgrade locations shall be proof-rolled by CONTRACTOR and approved by ENGINEER prior placement of fill.

3.06 EXCAVATION

- A. Excavate to elevations and dimensions necessary to complete construction as shown on the Contract Drawings.
- B. Trenching Tolerances:
 - 1. Excavate so pipes, ducts, and conduits can be laid straight at uniform grade, without sags or humps, between elevations shown on Contract Drawings.
 - 2. Trenches for the installation of gravity sewer mains shall be of sufficient depth so that the top of the pipe when installed will not be less than forty eight (48) inches below the surface of the finished grade and not less than sixty (60) inches for force mains. The maximum width for the trench shall be as shown on the plans. Where conditions prohibit excavation to required depth and when approved by ENGINEER, pipe insulation shall be used as approved by the ENGINEER.
 - 3. Excavation for manholes and appurtenances shall be sufficient to leave twelve (12) inches clear space between the structure and the bank, timber, or box which may be used to hold or protect the bank and to compact the backfill properly.
 - 4. Maximum width at surface of ground shall not exceed width of trench at top of pipe by more than 2 ft without permission of ENGINEER, unless specifically shown on Drawings.
 - 5. Minimum trench width shall be as shown on the plans.
 - 6. Excavate electrical duct or conduit trenches as required so top of concrete encasement or top of conduit shall be as shown on Contract Drawings.
- C. CONTRACTOR shall protect all shade trees, utility poles and private property along the line of the work, and shall provide for the protection of the public.
- D. Temporarily support and secure or cap, remove and relocate utility services in accordance with instructions by owners of services.
- E. Protect, support, and maintain conduits, wires, pipes, and other remaining utilities in accordance with requirements of owners of said services.
- F. Remove and replace or compact natural soils or compacted fills softened by frost, flooding, or weather.

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- G. Remove unsuitable material from within trenches as ordered by the ENGINEER.
- H. Stabilize trench bottom and replace unsuitable material with Pipe Bedding and Filter Fabric as required by the ENGINEER and shown on the Contract Drawings.
- I. Trench Dewatering:
 - 1. The CONTRACTOR shall build all drains and do all ditching, pumping, bailing, and all other work to keep the excavation clear of ground water, sewage, or storm water during the progress of the work and until the finished work is safe from injury.
 - 2. Where suitable construction conditions cannot possibly be obtained by other methods, the CONTRACTOR shall install and operate a wellpoint de-watering system to drain the excavation effectively.
 - 3. Wellpoint systems shall be sufficient in size to dewater excavations 24 inches below subgrade and shall be capable of maintaining the water table at such an elevation until the work required to be constructed in the dry is completed and until all structures will be safe from floatation due to high ground water. The CONTRACTOR is fully responsible for all such structures. Wellpoint systems shall be designed and supervised by a reputable de-water equipment supplier or contractor. All water pumped or drained from the work shall be disposed of in a manner satisfactory to the ENGINEER, and in accordance with all applicable local, state and federal requirements.
- J. Do not advance excavation of trenches more than 300 ft ahead of completed pipe installation. The ENGINEER reserves the right to control the length of trench to be opened in advance of pipe installation; if, in his opinion, the pipe laying and installation of appurtenances and services are not proceeding fast enough to complete the installation of pipe and backfilling with a reasonable length of time, the opening of additional trench will not be permitted.
- K. Do not excavate for manholes and other structures until scheduled for construction.
- L. Do not excavate within influence zone of existing footings or foundations without prior approval of ENGINEER.
- M. Upon completion of excavation, notify ENGINEER before proceeding with further Work.
- N. Excavation of Rigid Surfacing:
 - 1. Remove width 1 ft beyond anticipated edge of excavation.
 - 2. Saw cut to ensure straight joint.
 - 3. Surface replacement shall match existing surfacing unless otherwise shown on the contract Drawings.
- O. Excavation across Roadways:

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1. Excavation, backfill, and surface replacement shall conform to requirements as shown on the Contract Drawings. In no case shall surface replacement edges bear on less than 12-in. of undisturbed soil.
2. CONTRACTOR shall excavate trenches in which to place the new pipe lines. The depth and width of excavation shall be as shown on the Contract Drawings.
3. CONTRACTOR shall neatly saw cut all pavement and sidewalks prior to excavation.
 - a. The pavement shall be properly disposed of according to all Local, State and Federal regulations.
4. CONTRACTOR shall place and compact Pipe Bedding to bed the pipe and to cover the pipe to the depth shown on the Contract Drawings above the crown of the pipe (the "Pipe Zone").
5. For Work beneath roadways, CONTRACTOR shall use Select Granular Fill or Controlled Low Strength Material (flowable fill) to backfill the trench from the top of the Pipe Zone to the bottom of the Subbase as shown on the Contract Drawings and AOB.
6. CONTRACTOR shall place and compact crushed stone # 2 in the Pipe Zone to protect pipes that are subject to damage by abrasion (e.g. PVC pipe), in wet areas, or as ordered by the ENGINEER.
7. For Work beneath roads, CONTRACTOR shall place and compact Subbase Course, Type RC-1 as the subbase course beneath paved surfaces and structures as shown on the Contract Drawings.
8. CONTRACTOR shall place backfill materials in lifts and compact to achieve the in-place densities specified herein.

3.07 SHEETING AND BRACING

- A. If ordinary open-cut excavation is not possible or advisable, sheeting and bracing shall be furnished and installed in such excavation to prevent damage and delay to the work and to provide working conditions which are safe and acceptable to the New York State Department of Labor. Unless the sheeting and bracing is to remain in place, it shall be removed as the work progresses - in such a manner as to prevent the loosening and caving of the sides of the excavation and to prevent damage to finished work or adjacent structures and property. As soon as it is withdrawn, all voids left by the sheeting and bracing shall be filled with sand, crushed stone, or acceptable granular material and compacted.
- A. Sheeting and bracing shall be installed at all locations shown on the Plans or as ordered by the ENGINEER. However, nothing in these Specifications, nor any failure upon the part of the ENGINEER or the OWNER to order installation of sheeting and bracing, nor any comments regarding the method of sheeting and bracing shall be construed as relieving the CONTRACTOR from full responsibility for the safety and adequacy of such work. The CONTRACTOR shall retain full responsibility for safeguarding the finished work, the workmen, the public, and adjacent property, and shall take whatever measures believed

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necessary to do so, including sheeting and bracing of excavations, even though such measures may not have been shown or ordered by the ENGINEER.

- B. The CONTRACTOR may elect to use steel sheet piling for its convenience to facilitate construction, to help in de-watering operations, to protect the CONTRACTOR or others from damage to property or bodily harm, or for any other reason; however, an additional payment will not be made for this portion of the work.

3.08 SUBSURFACE OBSTRUCTIONS

- A. In excavating, trenching, laying pipe, and backfilling, care must be taken by the CONTRACTOR not to remove, disturb, or injure other pipes, conduits, cables, or structures, without the permission of the interested utility or the approval of the OWNER. If necessary, the CONTRACTOR shall, at its own expense, sling, shore up, and maintain such structures, in operation and shall repair any damage done thereto within a reasonable time. Repair of damages to such facilities shall be made to the satisfaction of the ENGINEER and the utility.
- B. The CONTRACTOR shall give sufficient notice in writing to the interested utility of its intention to remove or disturb any pipe, conduit, structure, etc., and shall abide by the utility regulations governing such work. In the event sub-surface structures are broken or damaged in the prosecution of the work, the CONTRACTOR shall immediately notify the proper authority and shall be responsible for any damage to person or property caused by such damage.
- C. When pipes, conduit, structures, etc. providing service to adjoining buildings are broken during the progress of the work, the CONTRACTOR shall repair them at once at its own expense, or, if preferred by the utility involved, shall pay the utility the proper charges for having such repairs made by the utility's own force. Delays such as would result in buildings being without service overnight or for needlessly long periods during the day will not be tolerated, and the OWNER reserves the right to make repairs at the CONTRACTOR's expense without prior notification. Should it become necessary to move the positions of a pipe, conduit, or structure, it shall be done by the CONTRACTOR in strict accordance with instructions given by the ENGINEER or the utility involved.

3.09 SURFACE OBSTRUCTIONS

- A. CONTRACTOR shall take every precaution to carefully protect all buildings, fences, walls, utility poles, trees, bridges, railroads, and other improvements from injury or damage, and, in the event of damage or removal of any of the foregoing obstructions during the progress of the work, they shall be repaired or replaced in a satisfactory manner (equal or better condition) - at the CONTRACTOR's expense - before final acceptance of the project.

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3.10 OBSTRUCTION OF STREETS AND PREMISES

- A. Excavated material shall be kept clear of sidewalks and interfere as little as possible with facility vehicular traffic except where local conditions make other arrangements necessary; in such event, the CONTRACTOR shall receive appropriate instructions from the ENGINEER in writing.
- B. The CONTRACTOR will not be permitted to close both sides of a double roadway street to vehicular travel, except by written permission from the OWNER for a specified period of time. As required and directed by the ENGINEER, the CONTRACTOR shall bridge the trench in a proper and secure manner so as to prevent any serious interruption to travel upon the roadway or sidewalk and to afford necessary access to particular public premises. The cost of all such work must be included in the prices paid for various pay items, and the CONTRACTOR shall receive no extra compensation for this work.
- C. Special care must be taken to give free access to all fire hydrants, water valve boxes and fire alarm boxes.

3.11 PREPARATION OF PIPE FOUNDATION

- A. The bottom of trenches for sewer and water main installation shall be excavated to a minimum depth 6 inches below the bottom of pipe grade. Bedding material shall be installed per the Contract Drawings. If the material in the trench is of such character that a firm foundation for pipe cannot be secured, such material shall be removed to a depth below grade as ordered by the ENGINEER, and the extra excavation replaced with crushed stone # 2 as ordered by the ENGINEER and thoroughly compacted to form an unyielding foundation.

3.12 PLACEMENT OF BACKFILL

- A. The trenches shall not be backfilled until the pipe work and appurtenances have been approved by the ENGINEER. The ENGINEER reserves the right to order any trench or trenches backfilled at any time after the installation of the pipe and appurtenances if, in the ENGINEER's opinion, the particular open trench or trenches constitute a public nuisance.
- B. Do not use frozen material or place fill on frozen subgrade.
- C. Use of Backfill Materials
 - 1. Select Granular Fill: Select granular fill shall be placed to the lines and grades as shown on the plans, as outlined herein, as outlined in section 02220 and as outlined in the Geotechnical Report. Fill shall be placed in loose lifts that will result in a maximum lift thickness of 8 inches. Each lift shall be compacted using vibratory equipment and shall be compacted to a minimum of 98% of the maximum dry density in all areas beneath structures and 95% of the maximum dry density in all other fill areas as determined by the Standard Proctor according to ASTM D-698.
 - 2. Pipe Bedding: Crushed Stone #1 and #2 shall be used to bed the pipe to the lines and grades as shown on the plans. The Pipe Zone shall be backfilled with select granular fill as shown on the Plans. The Pipe Zone extends from a depth of 6 inches below the invert of the

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pipe to an elevation shown on the Drawings. Bedding shall be placed in loose lifts that will result in a maximum lift thickness of 8 inches. Each lift shall be compacted using vibratory equipment and shall be compacted to a minimum of 95% of the maximum dry density as determined by the Standard Proctor according to ASTM D-698.

3. A minimum of twelve (12) inches of Subbase Course Type RC-1 material will be required under all roads as shown on the plans. Driveways, sidewalks, curbs or other structures or utilities requiring firm support shall be installed as shown on the plans. Subbase material shall be compacted using vibratory equipment and placed in lifts and thoroughly compacted in a manner approved by the ENGINEER.
 4. Hand grade and rake bottom of trench to establish uniform trench gradient.
 5. Excavated materials which are clean, consisting of earth, loam, sandy clay or other material approved by the ENGINEER in the field (Acceptable Earth Fill) may be used by the CONTRACTOR to backfill the trench excavation from the top of the Pipe Zone to the bottom of the subbase fill for work beneath all roads. Acceptable Earth Fill shall be free of large clods of earth, debris, pavement, abandoned pipe, structures or trash, rock or boulders over 4" diameter and soils containing vegetable or organic matter such as muck, peat, organic silt or any other deleterious matter.
 6. All other stone materials shall be placed in a maximum 8 inch lift and compacted as necessary using reasonable means as approved by the ENGINEER.
- D. Where pipes or electrical ducts cross, protect piping or ducts at higher elevation by backfilling trench within higher pipe or duct influence zone down to bedding of lower pipe or duct with #1 and #2 stone or with flowable fill when directed by the ENGINEER.
 - E. Where pipes or electrical ducts leave structures, protect by backfilling pipe or duct influence zone down to undisturbed soil with structural or controlled fill.
 - F. Do not backfill until new concrete have properly cured, coatings approved and required tests accepted.
 - G. Place fill simultaneously on both sides of free-standing structures.
 - H. Provide mechanical compaction for cohesive material and vibratory compaction for granular materials. When approved by ENGINEER, jetting, flooding, puddling or vibroflotation methods may be used for compacting if CONTRACTOR furnishes test results to confirm required degree of compaction being obtained uniformly throughout entire mass.
 - I. The trenches shall be backfilled with the materials specified on the Contract Drawings. The material shall be carefully placed in the trench so as not to move the pipe and compacted as specified below. Compactive effort is subject to the approval of the ENGINEER with specific areas requiring added compaction as directed by the ENGINEER.
 - J. Backfill materials shall be placed in lifts and compacted to the satisfaction of the ENGINEER. Maximum lift thicknesses and the requirements for compaction are specified herein.

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TRENCHING & EXCAVATION

3.13 EXCESS MATERIAL

- A. CONTRACTOR shall at CONTRACTOR's expense:
 - 1. Stockpile excavated material suitable for backfill on site.
 - 2. Place material as ordered by ENGINEER on-site.
 - 3. Remove material not required by OWNER from site and provide for proper disposal.
- B. OWNER has first right to excess excavated material suitable for backfilling or site grading, not required at job site.

3.14 MAINTENANCE

- A. The CONTRACTOR shall maintain all excavated areas by refilling for settlement, until final acceptance of the project in accordance with the applicable articles of the "General Conditions" and other requirements of these Specifications.

3.15 EROSION CONTROL

- A. Conduct site grading and drainage operations to prevent excessive soil erosion from construction site Work area.
- B. Provide means to prevent or minimize movement and washing of soil onto pavements or into adjacent ditches, swales, inlets, and drainage pipes to avoid possibility of drainage structures becoming clogged with soil.
- C. Remove soil and debris from structures, pipes, ditches, and other appurtenances to restore proper functioning.
- D. Protect water quality in all receiving streams, as required in the Special Conditions Section

3.16 CLEANING UP

- A. The CONTRACTOR shall remove all excess excavated material, rubbish, and debris from adjacent street surfaces, gutters, sidewalks, parking areas, grass plots, highway and railroad rights-of-way, etc., and the project as a whole shall be left in a neat and acceptable condition.

END OF SECTION

SECTION 02225
GEOTEXTILES

PART 1 GENERAL

1.01 SUMMARY

Under this Section, the CONTRACTOR shall furnish and install geotextile products for various applications including, but not limited to, behind rip rap, use in roadways, trenches, driveway tubes, sedimentation control fencing, under structures, and as shown on the plans.

1.02 SUBMITTALS

The CONTRACTOR shall provide the following submittals to the ENGINEER in accordance with the Standard Specifications:

- A. Geotextile - Manufacturer's technical information and data on material construction and physical and chemical properties.
- B. 6" x 6" material sample.

PART 2 PRODUCTS

2.01 MATERIAL

- A. Non-Woven Geotextile - Mirafi 140N, or approved equal
- B. Woven Geotextile – Mirafi 500X, or approved equal

PART 3 EXECUTION

3.01 INSTALLATION

Install in accordance with manufacturer's recommendations and details shown on the Contract Drawings and in these Specifications.

END OF SECTION

SECTION 02513
ASPHALT CONCRETE PAVING

PART 1 GENERAL

1.01 SUMMARY

- A. The CONTRACTOR shall furnish all labor, materials, and equipment necessary to install asphalt concrete paving as shown on the Contract Drawings, specified herein, and as necessary to complete the Work, including:
 - 1. Cutting and patching of street crossings.
 - 2. Restoration of roadways damaged by construction traffic.
 - 3. Restoration of roadways as shown in Drawings
 - 4. Construction of new roadways and parking areas
- B. Codes and Standards: Comply with NYSDOT Standard Specifications, latest edition.
- C. Weather Limitations: Apply prime and tack coats when ambient temperature is above 50°F (10°C), and when temperature has not been below 35°F (1°C) for 12 hrs immediately prior to application. Do not apply when base is wet or contains an excess of moisture.
- D. Construct asphalt concrete surface course when atmospheric temperature is above 40°F (4°C), and when base is dry. Binder course may be placed when air temperature is above 30°F (-1°C) and rising.
- E. Transport bituminous mixtures in covered trucks during rainy weather and when air temperature is less than 60°F.
- F. Adjust weight, type, capacity, haul routes, and method of operation of hauling vehicles so no damage results to existing streets, subgrade or base course.
- G. If directed by the ENGINEER, delay paving until the spring following completion of construction to allow for settling of subgrade.

1.02 SUBMITTALS

- A. CONTRACTOR to submit source location (vendor), mix design, and certification for each material required that the designs meet the requirements of the specifications. This design and certification shall be submitted per Section 01300.
- B. For each shipment of bituminous material brought to the site, the CONTRACTOR shall furnish a Bill-of-Lading containing the information itemized in NYSDOT Standard Specifications and Construction Materials dated January 2, 2002. Bills-of-Lading shall be delivered to the ENGINEER not later than the morning of the work-day following the delivery.
- C. Proposed paving CONTRACTOR (or subcontractor)
- D. Proposed pavement marking paint.
- E. Following completion of the paving work, it shall be the CONTRACTORS responsibility to submit a maintenance guarantee to the OWNER.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Type 3 Asphalt Binder Course - shall meet the requirements for NYSDOT Item 403.13.
- B. Type 7 Asphalt Top Course - shall meet the requirements for NYSDOT Item 403.19.
- C. Type 6 Asphalt Top Course - shall meet the requirements for NYSDOT Item 403.17.

SECTION 02513
ASPHALT CONCRETE PAVING

2.02 TACK COAT

- A. The Tack Coat shall be an asphalt emulsion meeting the requirements of NYSDOT Material Designation 702-90.

2.03 PAVEMENT MARKING PAINT

- A. CONTRACTOR shall submit for approval a description of the Pavement Marking Paint and the reflectorized glass beads that will be used for the marking of all pavement areas as shown on the Contract Drawings. The paint selected by the CONTRACTOR shall be specifically designed for use as a pavement marking paint and shall be approved by the ENGINEER before use.

PART 3 EXECUTION

3.01 GENERAL

- A. CONTRACTOR shall install all paving material in accordance with the provisions and procedures as specified in NYSDOT "Standards Specifications for Construction and Materials" dated January, 2, 2002, latest revisions. All material shall be installed at the locations and to the thicknesses shown on the Contract Drawings.

3.02 PAVEMENT CUTS

- A. All existing pavement edges, prior to placement of new paving, shall be saw cut to neat and smooth lines parallel with the existing street. Areas outside the pay limits shown on the Contract Drawings that are disturbed during construction shall be saw cut perpendicular to the street and squared off at 90 degree angles.

3.03 PAVEMENT PREPARATION

- A. Remove loose material from compacted subbase immediately before applying prime coat.
- B. If sufficient time has passed since placement of subbase that base course is rutted, loose or uneven, proof roll prepared surface to check for unstable areas and areas requiring additional compaction. Do not begin paving work until deficient areas have been re-graded and corrected and are ready to receive paving.
- C. Prime Coat
 1. Apply at rate of 0.20 to 0.50 gal per sq yd, over compacted subgrade.
 2. Apply material to penetrate and seal, but not flood, surface.
 3. Cure and dry as long as necessary to attain penetration and evaporation of volatile.
- D. Tack Coat:
 1. Apply to contact surfaces of previously constructed asphalt or portland cement concrete and surfaces abutting or projecting into asphalt concrete pavement.
 2. Distribute at rate of 0.05 to 0.15 gal per sq yd of surface.
 3. Allow to dry until at proper condition to receive paving.

SECTION 02513
ASPHALT CONCRETE PAVING

- 4. Exercise care in applying bituminous materials to avoid smearing of adjoining concrete surfaces. Remove and clean damaged surfaces.
- E. Remove loose material from compacted subbase immediately before applying tack coat.
- F. Sweep road immediately prior to placing tack coat for asphalt overlay.

3.04 PLACING MIX

- A. General
 - 1. Place asphalt concrete mixture on prepared surface, spread, and strike-off. Spread mixture at minimum temperature of 225°F (107°C). Place inaccessible and small areas by hand. Place course to required grade, cross-section, and compacted thickness.
- B. Placing
 - 1. Place in strips not less than 10-ft wide, unless otherwise acceptable to ENGINEER.
 - 2. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips.
 - 3. Grade Control: Establish and maintain required lines and elevations to within 3/8-in.
- C. Joints
 - 1. Make joints between old and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Construct joints to have same texture, density, and smoothness as other sections of asphalt concrete course. Clean contact surfaces and apply tack coat.
- D. Rolling
 - 1. General - Begin rolling when mixture will bear roller weight without excessive displacement. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.
 - 2. Breakdown Rolling: Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling, and repair displaced areas by loosening and filling, if required, with hot material.
 - 3. Second Rolling: Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been thoroughly compacted.
 - 4. Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained maximum density.
 - 5. Patching: Remove and replace paving areas mixed with foreign materials and defective areas. Cut-out such areas and fill with fresh, hot asphalt concrete. Compact by rolling to maximum surface density and smoothness.
- E. Protection
 - 1. After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened. Protect paving from traffic until mixture has cooled.
 - 2. Do not drive track equipment over finished paving. Where necessary protect with wood sheeting.

SECTION 02513
ASPHALT CONCRETE PAVING

3.05 FIELD QUALITY CONTROL

A. Pavement Testing

1. General: Test in-place asphalt concrete courses for compliance with requirements for thickness and surface smoothness. Repair or remove and replace unacceptable paving.
2. Tolerances: In-place compacted thickness shall meet or exceed dimensions specified on the drawings.
3. Surface Smoothness Tolerances: Test finished surface of final asphalt concrete course for smoothness, using 10-ft straightedge applied parallel with, and at right angles to centerline of paved area. Surfaces will not be acceptable if exceeding 1/8-in. tolerance for smoothness.

END SECTION

SECTION 02610
PIPELINE INSTALLATION

PART 1. GENERAL

1.01 WORK SPECIFIED

Installation of all metallic and non-metallic pipe, conduit, fittings and specials of the type and quality as shown in the pipe schedule or on the Contract Drawings.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Trenching and Excavation
- B. Ductile Iron Pipe
- C. Flexible Pipe Couplings
- D. Leakage Test
- E. Disinfection of Water mains
- F. Sanitary Sewer Work
- G. Storm Sewer Work

1.03 SUBMITTALS

Test reports, certifications, manufacturer's technical data, installation instructions, and shop drawings are required for each type of pipe to be installed.

Layout drawings are required for the pipeline to be installed within structures showing the location including the support system restraint, sleeves, and appurtenances.

PART 2. PRODUCTS

2.01 PIPE

- A Materials for the piping, joints and fittings shall be as specified in the section for the type of pipe to be installed, shown in the pipe schedule or on the Contract Drawings.
- B Pipe and appurtenances shall comply with the applicable standards for its type of material.

2.02 JOINTS

- A. Type of joints shall be as scheduled in the pipe schedule or as shown or noted on the Contract Drawings.
- B. Grooved and shoulder type joints of the rigid design may be used in lieu of flanged joints on the ductile iron or steel pipe with the prior acceptance of the ENGINEER.

2.03 INSPECTION

- A Pipe and appurtenances shall be inspected by the CONTRACTOR in the presence of the ENGINEER on delivery and prior to installation for conformance with the standards and specifications.
- B Materials not conforming to the standards and specifications shall not be stored on the site but removed at once and replaced with materials conforming to the specifications.

SECTION 02610
PIPELINE INSTALLATION

PART 3. EXECUTION

3.01 INSTALLATION - UNDERGROUND

A. General

1. Excavation and backfilling shall be in accordance with the applicable provisions of the Section entitled "Excavation and Backfill".
2. Blocking will not be permitted under pipe, except where the pipe is to be laid with concrete cradle or encasement.
3. No pipe shall be laid on a foundation in which frost exists, or at any time when there is danger of the formation of ice or the penetration of frost at the bottom of the excavation.
4. Temporary bulkheads shall be placed in all open ends of pipe whenever pipe laying is not actively in process. The bulkheads shall be designed to prevent the entrance of dirt, debris or water.
5. Precautions shall be taken to prevent the flotation of the pipe in the event of water entering the trench.
6. A 2" wide warning tape with continuous wording "CAUTION: BURIED PIPELINE BELOW" shall be installed not greater than 24 inches and not less than 12" above all pipelines.
7. Waterline installation shall conform to AWWA C600-93.

B. Location and Grade

1. Pipelines and appurtenances shall be located as shown on the Contract Drawings or as directed and as established from the control survey in accordance with the Special Provisions.
2. The alignment and grades shall be determined and maintained by a method acceptable to the ENGINEER.
3. All water lines shall be buried a minimum of 5 feet from top of pipe.

C. Subgrade

1. The subgrade for pipelines shall be earth or special embedment as specified or directed and shall be prepared in accordance with the Section 02221.

D. Joints

1. Joints shall be assembled using gaskets, lubricants and solvents as furnished by the pipe manufacturer and in accordance with the manufacturer's recommendations.

E. Wrapping of Pipe

1. Ductile iron pipe and fittings shall be wrapped in polyethylene per AWWA standards.

F. Embedment

1. Embedment shall be deposited and compacted in accordance with the Contract Drawings.

G. Thrust Restraints

1. Pressure pipelines shall have thrust restraints in the form of mechanical restraints of the size and type specified or as required by the pressure and stability of the supporting surface.
2. Thrust restraints shall be installed at all changes in direction, changes in size, dead ends or other locations where shown.
3. Thrust restraints shall be in place, and when of concrete (in accordance with Section 03300 – Concrete) shall have developed the required strength, prior to testing of the pipeline.

SECTION 02610
PIPELINE INSTALLATION

4. Tie rods and nuts for thrust restraints shall be of high tensile steel and shall have a minimum yield strength of 70,000 psi.
5. Tie rods and nuts installed underground shall be coated with two coats of coal tar pitch preservative coating after installation.

3.02 INSTALLATION – EXPOSED/ABOVE GROUND

Exposed pipelines shall be carefully erected, neatly arranged, and run parallel to wall of structure.

Supports and anchors shall be adequate to support the pipe filled with water with a minimum safety factor of 5 and for test pressure specified.

Special supports shall be as specified in the Section for the type of pipe being installed.

All water pipelines and fittings shall be wrapped in closed-cell foam insulation and sealed to prevent condensation.

3.04 CUTTING AND SPECIAL HANDLING

Field cuts of pipes shall be in accordance with the manufacturer's instructions.

Where a pipe requires special handling or installation it shall be in accordance with the Section for that type of pipe.

3.05 FLEXIBLE COUPLINGS

Flexible couplings shall be provided where shown or scheduled.

3.06 WALL CASTINGS AND SLEEVES

All pipelines passing through walls, floors or slabs of structures shall be installed in a wall casting or sleeve. The wall castings and sleeves shall be in accordance with the Section 15095.

3.07 LEAKAGE TEST

All pipelines shall be tested for leakage in accordance with the Section 02660.

3.08 CHLORINATION

All pipelines designed to convey potable water shall be chlorinated in accordance with Section 02510.

3.09 TRACER TAPE

All pipelines constructed of either PVC or HDPE shall be buried with detectable tracer tape installed per manufacturer's recommendations. Tracer tape shall be Trumbull Industries or approved equal.

SECTION 02610
PIPELINE INSTALLATION

3.10 ADJUSTMENT OF UTILITY COVERS TO GRADE

The CONTRACTOR shall adjust the existing facilities such as water valves, valve boxes, and any other utility to grade, alignment, and slope of the finished roadway as determined by OWNER.

The CONTRACTOR shall support and protect all existing utilities within his work area. All manholes, frames and covers and water valve boxes of all existing utilities disturbed or exposed by construction shall be adjusted by the CONTRACTOR to one-quarter inch (1/4") below new finished grade elevations prior to placement of final pavement.

END OF SECTION

SECTION 02615
DUCTILE IRON PIPE

PART 1 GENERAL

1.01 SUMMARY

- A. Work Specified
 - 1. Centrifugally cast cement lined ductile iron pipe and fittings of the pressure class as specified in the pipe schedule or as shown on the Contract Drawings.
 - 2. Centrifugally cast ductile iron pipe and fittings of the pressure class as specified in the pipe schedule or as shown on the Contract Drawings.
- B. Related Work Specified Elsewhere - Trench, Backfill & Compaction

1.02 RELATED SECTIONS

- A. Section 02660 – Hydrostatic Pressure and Leakage Testing

1.03 REFERENCES

- A. Applicable Codes, Standards and Specifications
 - 1. American National Standards Institute (ANSI)
 - 2. American Water Works Association (AWWA)
 - 3. American Society for Testing and Materials (ASTM)

1.03 SUBMITTALS

- A. The manufacturer shall furnish sworn statements that all of the specified tests have been made and the results thereof comply with the requirements of the specified standards.
- B. Pipe and joint details.
- C. Layout drawings for Ductile Iron Pipe to be installed within structures showing the location including details of the support system, sleeves and appurtenances.

PART 2 PRODUCTS

2.01 PIPE

A. MATERIALS

- 1. Ductile Iron pipe and fittings shall comply with the following ANNI/AWWA standards:

Ductile Iron Pipe	C151
Fittings	C110
Joints-Mechanical and Push-On	C111
Joints-Flanged	C115
Cement Lining	C104
Polyethylene Encasement	C105

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SECTION 02615
DUCTILE IRON PIPE

- B. All piping shall be as scheduled as follows:
1. Buried Pressure Piping
 - a. $\leq 6''$, class 53
 - b. greater than 6'' and less than or equal to 16'', class 53
 - c. greater than 16'', class 53
 2. Interior Gallery Piping
 - a. $\leq 24''$, class 53
 - b. greater than 24'', class 53
- C. All pipe and fittings shall be American manufactured and shall be new and of first class materials and construction.
- D. All interior of ductile iron pipe and fittings shall be cement mortar lined with a bituminous seal coat in accordance with these specifications. All pipe exterior shall be polyethylene encased in accordance with these specifications.
- E. All shipments of material shall be tested in accordance with the provisions for testing in the applicable standards.
- F. General Requirements
1. All buried Ductile Iron pipe and fittings shall comply with the following standards:

ANSI/AWWA

Ductile Iron Pipe	C151
Fittings	C110
Joints-Mechanical and Push-On	C111
Joints-Flanged	C115
Cement Lining	C104
Polyethylene Encasement	C105

- G. Interior Pipe
1. All interior gallery piping and fittings shall be exterior primed for painting.

2.02 CEMENT MORTAR LINING AND BITUMINOUS COATING

- A. Cement Mortar lining shall meet AWWA C104 and ANSI A21.4 recommendations.
- B. Apply bituminous seal coat over cement lining on inside of pipe. Coating shall be smooth, tough, tenacious, and impervious to water without any tendency to scale off and shall not be brittle.

SECTION 02615
DUCTILE IRON PIPE

2.03 POLYETHYLENE PIPE ENCASEMENT

- A. Polyethylene encasement installation and materials shall conform to ANSI/AWWA C105/A21.5.
- B. Polyethylene wrap for piping encasement shall be manufactured of virgin polyethylene material conforming to the requirements of ANSI/ASTM Standard Specification D1248.
- C. Polyethylene wrap shall be either linear low density, 8-mil minimum thickness film (LLDPE), or high-density, cross-laminated 4-mil minimum thickness film (HDCLPE) and shall be labeled with the manufacturers name, year of manufacture and "ANSI/AWWA C105/A21.5".

2.04 FITTINGS

- A. All fittings shall conform to ANSI/AWWA C110/A21.10 specifications.
- B. Buried Pipe Fittings
 - 1. All fittings for buried piping shall have compact ductile iron mechanical joints and shall conform to ANSI/AWWA C111/A21.11 specifications.
 - 2. All fittings for buried pipe shall be cement mortar lined with bituminous coating
- C. Flanged Fitting
 - 1. All flanged fitting shall conform with ANSI/AWWA pipe barrel specification C151/A21.51, and flanges per ANSI/AWWA C115/A21.15. Flanges must be made from ductile iron. Grey iron flanges will not be acceptable.

2.05 YARD HYDRANT

- A. Yard Hydrants shall be manufactured by Zurn and shall be Model Z1390, exposed head, non-freeze or approved equal.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Trench, backfill, and compact in accordance with Sections 02221.
- B. Restrain piping and fittings at changes of alignment in accordance with pipe restraint details on Contract Drawings.
- C. All ductile iron pipe and fittings shall be handled with padded slings or other appropriate equipment. The use of cables, hooks or chains will not be permitted.
- D. Where pipe grades exceed 5% slope, the pipe shall be installed such that the bell is located on the upslope side.
- E. Unless otherwise indicated on the drawings or ordered by Engineer all ductile iron pipe shall be laid in Type 4 bedding conditions in accordance with the Ductile Iron Pipe Research Association (DIPRA).

SECTION 02615
DUCTILE IRON PIPE

3.02 JOINTS

- A. Mechanical joints shall be assembled in accordance with the notes on Method of Installation, AWWA C111, Appendix A. All bolts shall be tightened by means of torque wrenches such that the follower shall be brought up evenly. If effective sealing is not obtained at the specified torques, the joint shall be disassembled, cleaned and reassembled.
- B. Push-on joints shall be assembled using lubricant furnished by the manufacturer. The joint shall be made by guiding the plain end into the bell until contact is made with the gasket and exerting sufficient force to drive the pipe home until penetration is made to the depth recommended by the manufacturer.
- F. Flanged joints shall be assembled with through bolts of the size required for the pipe being installed. Stud bolts shall be used only where shown or required. Connecting flanges shall be in proper alignment and no external force shall be required or used to bring them together.
 - 1. Flanges for flanged joints shall be drilled for 125 psi pressure unless otherwise specified.
 - a. Flange bolts and nuts shall be steel, ASTM A307, Grade B, and shall be cadmium plated except where other materials are called for in the pipe schedule.
 - b. Cadmium plating shall be a thickness of 0.0003 to 0.0005 inches.
 - c. Gaskets for water and sewage piping shall be 1/8 inch thick of the ring type of cloth inserted rubber unless otherwise specified.
 - d. Gaskets for other service shall be as specified.
- G. UNI-FLANGES shall be installed where specified on the contract drawings. They shall be of ductile iron. Set screws shall be AISI 4140 high strength low alloy steel; 190,000 psi tensile strength with the corrosion resistance of CORTEN. Case and core hardened. Dipped in corrosion protection solution - NOT plated. Flanges shall be "Kwick-Flange" as manufactured by Standard International or approved equal.
- H. Grooved and shoulder type joints of the rigid design may be used in lieu of flanged joints with the prior acceptance of the Engineer and shall be in accordance with AWWA C606 and Table 5 for iron pipe.
 - 1. Bolts and nuts shall be cadmium plated steel.
 - 2. Details of supports, anchors and couplings shall be submitted for review.

3.03 COATING, PAINTING AND LINING

- A. Coating, painting and lining shall be as follows unless otherwise specified in the pipe schedule:
 - 1. Pipe installed in the ground, in exposed exterior locations, in contact with water or inside structures but not scheduled for painting:
 - a. Interior: Bituminous coating or standard thickness cement lining with sealcoat unless otherwise specified.
 - b. Exterior: Bituminous coating.
 - 2. Pipe installed inside structures or scheduled for painting:
 - a. Interior: Bituminous coating or standard thickness cement lining with sealcoat unless otherwise specified.

SECTION 02615
DUCTILE IRON PIPE

- b. Exterior: Pipes with bituminous coatings shall be coated with Inertol "Tar Stop", or Mobil Anti-Bleeding Sealer Aluminum 13-A-1 or equal, or sandblasted as specified, before additional coats described in the piping schedule to receive field painting, a shop prime coat of TNEMEC Series 69 Hi-Build Epoxyliner or equal may be supplied. If a shop prime is applied, the field prime specified in the Section entitled "Painting" shall be touch up only.
- B. Polyethylene encasement shall be supplied and installed per DIPRA Guidelines on those sections of the pipe as indicated on the Plans or AOB.

3.04 TESTING

- A. See Section 02660 –Leakage Testing

END OF SECTION

SECTION 02660
HYDROSTATIC PRESSURE AND LEAKAGE TESTING

PART 1 – GENERAL

1.01 RELATED SECTIONS

- A. Section 02615 – Ductile Iron Pipe
- B. Section 02617 – HDPE Pipe
- C. Section 02631 – Manholes, Concrete Structures and Vacuum Testing

1.02 REFERENCE

- A. AWWA C600
- B. ASTM F2164

1.03 WORK INCLUDED

- A. Testing of all hydraulic structures, pressure and non-pressure piping for leakage as specified.
 - 1. The CONTRACTOR shall furnish all labor, equipment, test connections, vents, water and materials necessary for carrying out the pressure and leakage tests.
 - 2. CONTRACTOR shall use potable water only.
- B. All testing shall be witnessed by the ENGINEER or OWNER.

PART 2 PRODUCTS

(not used)

PART 3 – EXECUTION

3.01 LEAKAGE TESTS

- A. If vacuum testing can not be performed on the concrete structures, a hydrostatic leakage test shall be performed.
- B. Tanks, vaults, wells and other fluid containing structures, (excluding manholes), shall be tested after backfilling by filling the structure with water to overflowing, or other level as may be directed by the ENGINEER, and observing the water surface level twenty-four hours thereafter.
 - 1. When testing absorbent materials such as concrete, the structure shall be filled with water at least 24 hours before the test is started.
- C. The exterior surface, especially at the construction joint, will be inspected for leakage during and upon completion of the 24-hour test.
 - 1. Leakage will be considered to be within the allowable limits when there is no visible sign of leakage on the exterior surface and where the water surface does not drop except as associated with evaporation.
 - 2. A slight dampness on the exterior wall surface during the test period will not be considered as leakage, except in the case of prestressed concrete structures.

SECTION 02660
HYDROSTATIC PRESSURE AND LEAKAGE TESTING

3.02 TESTS ON PRESSURE PIPING FOR TRANSPORT OF WATER OR SEWAGE (FORCE MAINS)

A. General

1. The newly constructed water or sewer main shall be pressure tested according to ANSI/AWWA C600, Section 4: Hydrostatic Testing.
2. Take all necessary precautions to prevent dirt, debris, or other foreign material from entering the water or sewer main, services, or appurtenances. Remove such material from the water or sewer main, services or appurtenances at no additional expense to the Contract.
3. Pipelines designed to transport water or sewage under pressure shall be tested hydrostatically and for leakage prior to being placed in service.
4. The length of piping and sections included in the tests shall meet the approval of the ENGINEER, but shall not exceed 1,000 lineal feet.
5. The pipe shall be tested at whichever pressure is greater:
 - 1) 150 psi
 - 2) 1.5 times the working pressure of the pipe - See Contract Plans for Working Pressure.
6. Equipment in or attached to the pipes being tested shall be protected. Any damage to such equipment during the test shall be repaired by the CONTRACTOR at his expense.
7. When piping is to be insulated or concealed in a structure, tests shall be made before the pipe is covered.
8. All fittings, hydrants and appurtenances must be properly braced and harnessed before the pressure is applied. Thrust restraining devices which will become a part of the system must also be tested at the test pressure.
9. CONTRACTOR shall use potable water only. Water for flushing and testing lines shall be provided by the CONTRACTOR.
10. If the line fails the test, the CONTRACTOR shall explore for the cause of the excessive leakage and after repairs have been made the line shall be retested. This procedure shall be repeated until the pipe complies at no additional expense to the Contract and without extension of time for completion of the work.

B. Pressure Test

1. Test pressure shall be as scheduled at 1-1/2 times working pressure or where no pressure is scheduled at 150 psi.
2. Test pressure shall be held on the piping for a period of at least 2 hours, unless a longer period is requested by the ENGINEER.
3. The pressure test passes if the pressure remains within 5 psi of the original pressure.

C. Leakage Test for Ductile Iron and PVC Pipe

1. The leakage test shall be conducted concurrently with the pressure test.
2. The rate of leakage shall be determined at 15-minute intervals by means of volumetric measurement of the makeup water added to maintain the test pressure. The test shall proceed until the rate of leakage has stabilized or is decreasing below an allowable value, for three (3) consecutive 15-minute intervals. After this, the test pressure shall be maintained for at least another 15 minutes.
 - a. At the completion of the test, the pressure shall be released at the furthestmost point from the point of application.
3. All exposed piping shall be examined during the test and all leaks, defective material or joints shall be repaired or replaced before repeating tests.

SECTION 02660
HYDROSTATIC PRESSURE AND LEAKAGE TESTING

4. Unless the local standards are more stringent, use the following formula for allowable leakage (gph).

$$L \text{ (gph)} = \frac{SD(P)^{1/2}}{133,200}$$

S = Length of pipe tested (feet).

D = Nominal diameter of the pipe, (inches).

P = Average test pressure during the leakage test, (psig).

5. Regardless of the above allowables, any visible leaks shall be permanently stopped.

D. Leakage Test for HDPE Pipe

1. The leakage test shall be conducted concurrently with the pressure test.
2. Shall be tested per ASTM F2164 – Non-Monitored Make-up Water Test
 - a. The test procedure consists of initial expansion phase and test phase.
 - b. Initial expansion phase
 1. Make-up water is added as required to maintain the test pressure for four (4) hours.
 - c. Test phase
 1. The test pressure is reduced by 10 psi.
 2. If the pressure remains steady (within 5 % of the target value) for one (1) hour, no leakage is indicated.
3. All exposed piping shall be examined during the test and all leaks, defective material or joints shall be repaired or replaced before repeating tests.
4. Any visible leaks shall be permanently stopped.

E. Leakage Test for PCCP Pipe

1. The leakage test shall be conducted concurrently with the pressure test.
2. The rate of leakage shall be determined at 15-minute intervals by means of volumetric measurement of the makeup water added to maintain the test pressure. The test shall proceed until the rate of leakage has stabilized or is decreasing below an allowable value, for three (3) consecutive 15-minute intervals. After this, the test pressure shall be maintained for at least another 15 minutes.
 - a. At the completion of the test, the pressure shall be released at the furthestmost point from the point of application.
3. All exposed piping shall be examined during the test and all leaks, defective material or joints shall be repaired or replaced before repeating tests.
4. The line will not be accepted until this measured quality is less than 10 gallons per inch of diameter per mile of pipe per 24 hours. All visible leaks must be repaired regardless of the measured leakage.
5. Regardless of the above allowables, any visible leaks shall be permanently stopped.

END OF SECTION

SECTION 02720
POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The CONTRACTOR shall furnish all labor, materials, tools, supervision, transportation, and installation equipment necessary for installation of all polyvinyl chloride pipe (PVC), fittings and appurtenances as specified herein for the sanitary sewer system, as shown on the Drawings and in accordance with the Specifications.
- B. The CONTRACTOR shall be prepared to install PVC pipe and fittings in conjunction with the earthwork and other related components of work.

1.02 RELATED SECTIONS

- A. Section 02221 – Trenching and Excavation
- B. Section 02601 – Sanitary Sewer Work
- C. Section 02631 – Manholes and Drainage Structures
- D. Section 02660 – Leakage Test

1.03 SUBMITTALS

- A. The CONTRACTOR shall submit to the OWNER for approval within 14 days prior to the start of pipe work, complete, detailed shop drawings of all PVC pipe and fittings, a list of materials to be furnished, and the name of the pipe manufacturer.
- B. The CONTRACTOR shall submit to the ENGINEER the PVC pipe manufacturer's certification of compliance with herein.
- C. CONTRACTOR shall submit all quality control information and quantity records as outlined in Section 01300 on a minimum basis of once per week during active work under this specification.
- D. Certification of full compliance with the ARRA Buy American requirements.

PART 2 PRODUCTS

2.01 POLYVINYL CHLORIDE (PVC) COMPOUND

ASTM 3034-93

- A. SDR-35.
- B. SDR-26 - ASTM D3034, Heavy Wall Non-Pressure Pipe.
- C. Push-on joint - ASTM 3212-92.
- D. SDR-21 – ASTM D2241.

SECTION 02720
POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

2.02 PVC PIPES AND FITTINGS

- A. SDR-26 (ASTM D3034, Heavy Wall Non-Pressure Pipe)
- B. SDR-21, suitable for pressure sewer pipe.
- C. PVC pipes and fittings shall be homogeneous throughout and free of visible cracks, holes foreign inclusions, or other deleterious effects, and shall be uniform in color, density, melt index and other physical properties.
- D. All plastic sewer pipe and fittings shall meet the requirements of ASTM D3034. The standard dimension ratio (SDR) of all pipe and fittings shall not exceed 35 unless otherwise specified.
- E. All pipe shall be suitable for use as gravity sewer pipe. Sizes and dimensions shall be as designated in ASTM D3034. Standard laying lengths shall be 13 feet or 20 feet \pm 1 inch. At manufacturer's option, random lengths may be shipped not to exceed 10% of total footage.
- F. All joints shall be of the bell and spigot type and conform to ASTM D3212 and/or Uni-Bell Uni-B-1. Gaskets shall be in accordance with ASTM F477. All bells shall be formed integrally with the pipe and shall contain a factory installed elastomeric gasket, which is positively retained. No solvent cement joints will be permitted in field construction except as specifically authorized by the engineer.
- G. All fittings shall be furnished by the pipe supplier or approved alternate supplier. All fittings shall have a push-on joint, which is compatible with the pipe and conforms to ASTM D3034. Minimum Pipe Stiffness (F/δ) at 5% deflection shall be 46 psi for all sizes when tested in accordance with ASTM D2412.
- H. Impact tests shall be conducted in accordance with ASTM D2444 and shall comply with the requirements given in ASTM D3034.
- I. Infiltration shall not exceed 50 gallons/inch/mile/day.
- J. Deflection tests for 100% of the pipe installed shall be conducted, although for small installations ENGINEER may waive this requirement. Deflection shall be measured by pulling a mandrel or other device through the pipe.

SDR Dimensions and Weights

Nominal Pipe Size Inches	Pipe O.D. Inches	SDR – 35			SDR – 26		
		Min Wall Inches	Weight Lbs./Ft.		Min Wall Inches	Weight Lbs./Ft.	
			20' Length	40' Length		20' Length	40' Length
4	4.215	.120	1.04	1.03	.162	1.38	-
6	6.275	.180	2.32	2.30	.241	3.08	-
8	8.400	.240	4.18	4.13	.323	5.57	-
10	10.500	.300	6.55	6.46	.404	8.74	-
12	12.500	.360	9.36	9.22	.481	12.41	-
15	15.300	.437	13.97	13.75	.588	18.65	-

Refer to Uni-Bell's Handbook of PVC Pipe for dimensions and weights not shown in above table.

2.03 IDENTIFICATION

The following shall be continuously indent printed on the pipe, or spaced at intervals not exceeding 5 feet:

- 1. Name and/or trademark of the pipe manufacturer.

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SECTION 02720
POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

2. Nominal pipe size.
3. Schedule.
4. Manufacturing Standard Reference (e.g., ASTM D 3034-93).
5. A production code from which the date and place of manufacture can be determined.

2.04 PVC PIPE and FITTINGS for SCH 40 and SCH 80 PRESSURE PIPE

A. This specification section covers the manufacturers' requirements for PVC Schedule 40 and Schedule 80 IPS pressure pipe. The pipe and fittings meet or exceed all applicable ASTM, NSF and CSA standards and are suitable for potable water.

B. Materials

Rigid PVC (polyvinyl chloride) used in the extrusion of Schedule 40 & 80 pipe and fittings complies with the material requirements of ASTM D1784 (formerly Type 1, Grade 1) and has a cell classification of 12454. Raw material used in the extrusion shall contain the standard specified amounts of color pigment, stabilizers and other additives. The compounds used are listed to the requirements of NSF 61 for use in potable water service.

C. Dimensions

Physical dimensions and properties of Xirtec140 PVC Schedule 40 and 80 pipe and fittings shall meet the requirements of ASTM D1785 and/or be certified to CSA B137.3. Socket dimensions of belled end pipe shall meet the requirements of ASTM D2672 or F480.

D. Marking

PVC Schedule 40 and 80 pipe is marked as prescribed in ASTM D1785, NSF 14 and/or CSA B137.0/137.3. The marking includes the following: IPEX; Xirtec140; IPS PVC and the Schedule and Pressure Rating at 73°F (23°C); ASTM D1785; CSA B137.3; NSF 14; and NSF 61 Potable.

E. Standard Requirements

PVC Schedule 40 and 80 pipe shall conform to ASTM D1785, NSF 14, and/or CSA B137.0/B137.3. Schedule 40 fittings shall conform to ASTM D2466. Schedule 80 socket fittings shall conform to ASTM D2467 and Schedule 80 threaded fittings shall conform to ASTM D2464. All fittings must be third party certified to NSF 14.

All Schedule 80 fabricated fittings shall be reinforced with fiberglass reinforced plastic (FRP). All PVC fittings shall be molded or fabricated from PVC compound compatible with the pipe material.

Only Schedule 80 pipe shall be threaded and the pressure rating shall be reduced by 50%. Belled end pipe socket dimensions shall conform to ASTM D2672 or F480. All pipe, fittings and valves shall be Xirtec140 and produced by one manufacturer; as supplied by IPEX or approved equal.

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POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

F. FABRICATED FITTINGS

Pressure Rating

The pressure rating of the fitting shall be the same as that of the pipe used in the fabrication of the fitting. The pipe shall be certified to CSA B137.3 and NSF 14.

Hydrostatic Pressure Test of Fittings

At the engineer's or customer's request, representative sample fittings may be assembled and pressure tested for 1,000 hours at 1-1/2 times the pressure rating of the pipe at 73°F (23°C). At the end of the 1,000 hours, the pressure shall be increased to 2-1/2 times the pressure rating within two minutes. No failure shall occur.

Quality Control Tests

Joints from fittings shall be subjected to a spark test (power source of 24,000 volts). The joint shall not permit any passage of spark at any point along the weld.

Fiberglass Reinforcing

Fiberglass reinforcing should be applied to the fitting in such a manner and thickness to meet the hydrostatic pressure requirements specified. Bonding shall be done with primer resin to provide an adequate bond to the PVC pipe.

Marking

All fittings to have an exterior label identifying size, configuration, pressure rating and manufacturer's name.

Socket Weld Depths

Each solvent weld bell must have a minimum socket depth of one-half times the pipe diameter.

One-Source Supply

All components of a piping system including pipe, fittings and valves, shall be supplied by one manufacturer as supplied by IPEX or approved equal

2.05 TRANSPORTATION

Transportation of PVC pipe and fittings shall be the responsibility of the CONTRACTOR. The CONTRACTOR shall be liable for all damage to the PVC pipe and fittings incurred prior to and during transportation to the site.

SECTION 02720
POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

PART 3 EXECUTION

3.01 HANDLING AND PLACEMENT

A. Survey, Lines, and Grades

The ENGINEER has established a benchmark and lines, and grades shall be as established on the Contract Drawings. The CONTRACTOR will be responsible for the proper execution of the work to the lines and grades so established.

The CONTRACTOR shall take every precaution to protect all stakes and, should replacement become necessary, it shall be done at the CONTRACTOR's expense. The CONTRACTOR shall also furnish any supplementary lines and grades that may be needed for construction purposes, including blue-top grade stakes.

The CONTRACTOR shall stake the pipelines and appurtenances as to location, lines, and grades and shall furnish the ENGINEER with offset hub elevations (at a maximum of 50 feet o.c.) with corresponding stations of distance. He shall also furnish such other pertinent information as is necessary for proper measurement and determination of quantities. The ENGINEER will check all cut sheets before installation of any pipe.

Setting of grade by use of a laser instrument or device (in lieu of setting batter boards) is acceptable. Laser instruments shall be used in accordance with manufacturer's recommendations.

The CONTRACTOR will maintain an adequate power supply and provide continuous power ventilation in the pipeline, in accordance with the laser equipment manufacturer's recommendations, wherever the laser equipment is in use.

The adjustment of the laser equipment for accuracy shall be made by qualified personnel, using surveying instruments at the start of each day's pipe laying and at any time deemed necessary by the ENGINEER to assure accuracy of the laser alignment.

It is the CONTRACTOR's sole responsibility for the accuracy of the laser equipment; any section of pipe found to be at the wrong grade or to have settled, shall be dug up and relaid to the satisfaction of the ENGINEER and at the CONTRACTOR's sole expense.

In order to ensure pipe is being installed at the proper grade and alignment, offset hubs shall be set fifty (50') feet from the beginning manhole. These hubs shall be used to check line and elevation as pipe installation progresses.

As-built invert elevations shall be established by the CONTRACTOR at each manhole or cleanout and furnished to the ENGINEER prior to proceeding out of the manhole or cleanout with pipe toward the next manhole or cleanout.

3.02 INSTALLATION OF GRAVITY SEWERS AND FORCE MAINS

A. Excavating, Trenching, Backfilling and Compacting

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Excavating, trenching and backfilling shall be done in accordance with Section 02221 of these specifications.

B. Sewer Relation to Water Mains

1. Horizontal Separation

Whenever possible, sewers should be laid at least 10 feet horizontally from any existing or proposed water main. Should local conditions prevent a lateral separation of 10 feet, a sewer may be laid closer than 10 feet to a water main if:

- a. It is laid in a separate trench, or
- b. It is laid in the same trench with the water mains located at one side, on a bench of undisturbed earth, and if
- c. In either case, the elevation of the top (crown) of the sewer is at least 18" below the bottom (invert) of the water main.

2. Vertical Separation

Whenever sewers must cross under water main, the sewer shall be laid at such an elevation that the top of the sewer is at least 18" below the bottom of the water main. When the elevation of the sewer cannot be varied to meet the above requirements, the water main shall be relocated to provide this separation or reconstructed with push-on type joint pipe for a distance of 10 feet on each side of the sewer. One full length of water main should be centered over the sewer so that both joints will be as far from the sewer as possible.

3. Special Conditions

When it is impossible to obtain proper horizontal and vertical separation as stipulated above, the water main should be constructed of a push-on or mechanical-joint ductile iron pipe, and the sewer constructed of C-900 PVC pipe and both pressure tested to assure water tightness.

C. Sewer Relation to Other Utilities

In addition to the requirements in Section 02221, Subsurface Obstructions and the above, and other requirements of these specifications, there shall be at least a vertical separation with other utilities or obstructions of three (3) inches. Approved granular material such as crushed stone, sand, etc. shall be placed between the two objects, unless the ENGINEER specifies concrete encasement. If the required three (3) inches cannot be attained, the ENGINEER shall be notified.

D. Bedding, Pipe Zone Material

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The pipe zone is defined as extending vertically from the trench bottom to a minimum height as shown on the Contract Drawings above the top of pipe bell. It contains the bedding material and the pipe zone backfill; above it is the general backfill.

In general, pipe zone bedding material shall be placed a minimum of six (6) inches under the pipe and twelve (12) inches over the pipe for the full width of trench. Pipe zone bedding material shall be graded #1 and #2 stone (in conformance with Section 02221 of these specifications) and shall be approved by the ENGINEER. Bedding material shall be placed and well compacted in a minimum bedding depth of six (6) inch below the pipe and 12 inches above the pipe.

Select granular fill will then be placed to the height shown on the Contract Drawings above the pipe bell or as directed by the ENGINEER. The pipe zone backfill material shall be placed and well compacted in 8-inch lifts.

General backfilling and compaction above the pipe zone backfill shall be in accordance with Section 02221 of these specifications.

E. Pipe Laying: Force Mains

Trenching and backfilling shall be performed in accordance with the applicable provisions of Section 02221 of these specifications.

In general, the trench bottom shall be shaped to give uniform support to the lower one-third (or $\frac{1}{2}$) of the pipe. All adjustments to grade shall be made by hand-scraping or hand-filling and thorough tamping under the body of the pipe to prevent subsequent movement.

If the maximum width of the trench (as specified or shown on the plans) is exceeded for any reason except by order of the ENGINEER, the CONTRACTOR shall, at his own expense, install concrete cradle (or other bedding as may be required by the ENGINEER) to properly support the pipe being installed.

The CONTRACTOR shall utilize proper and suitable equipment, tools, and appliances for the safe and convenient handling and installation of the pipe. Care shall be taken not to damage the pipe or pipe lining.

Immediately prior to placing each pipe or fitting in the trench, the portions to be joined shall be carefully examined for defects. Pipe, collars, and gaskets shall be cleaned of all dirt and foreign material. Lubricants, glues, or bolts required for the pipe being installed shall then be applied in accordance with the manufacturer's recommendations, and the pipes carefully jointed.

The pipe bedding shall be prepared so that the entire length of the pipe shall be supported. Bell holes, if required for the type of pipe being installed, shall be dug in the bedding to provide the above pipe support and to allow for the proper and thorough preparation and jointing of the pipe. Once the joint has been made, care shall be taken to prevent deflection of the pipe installed or separation of the joint.

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While pipe laying is in progress, the CONTRACTOR shall take all precautions or necessary steps to keep the trench free of water.

Unless permission is specifically granted in writing by the ENGINEER, every joint shall be made up in the trench, and the CONTRACTOR shall not install two or more pipes jointed together at the top of the trench.

When work is suspended for the night or for any other reason, the open ends of the pipe, fittings, etc. shall be thoroughly sealed, with an approved type of plug for the pipe being installed, to prevent the entrance of soil or foreign materials. Dead ends of pipe, unused branches of trees, crosses, wyes, and valves, etc. shall be sealed with plugs or caps suitable to the type of pipe being used, so that the pipe can be tested (as specified further on in this section).

Pipe alignment, for gravity sewers between manholes, shall be such as to show a full circle of light when being examined from either end.

Force mains shall be laid to the alignment shown on the contract plans. Dips and high points in the vertical alignment of the pipe will not be allowed, unless the terrain requires a cover over the pipe exceeding eight (8) feet.

F. Defective Sewers

If it is found, during the testing and/or inspection of the sewers installed, that a pipe is broken, cracked, settled, or sheared within twenty-five (25) feet of any manhole, the CONTRACTOR shall effect the repair as follows: the existing sewer pipe shall be removed (from the manhole to the next good joint beyond the defective segment), and new sewer pipe shall be reinstalled from the good joint back into the manhole, in a manner approved by the ENGINEER.

If a broken, cracked, or sheared pipe is found beyond twenty-five (25) feet of a manhole, the sewer shall be excavated and repaired at that point, in a manner approved by the ENGINEER.

The costs involved in repairing the above (or any other defects found) shall be done at the CONTRACTOR's own cost and expense, and no additional monies will be allowed for same.

G. Concrete in Sewer or Water main Trenches

Wherever shown on the plans or deemed necessary by the ENGINEER for protection of the sewer or water pipe, the CONTRACTOR shall install concrete cradle under (or concrete encasement around) the sewer pipe.

Unless otherwise shown on the drawings or directed by the ENGINEER, concrete cradle shall be a minimum depth of six (6") inches under the barrel of the pipe and a minimum width of six (6") inches - measured horizontally from the outside of the pipe bell at the spring line. Concrete cradle shall be placed to the spring line of the pipe, in accordance with the above dimensions.

Concrete encasement shall be defined as a complete covering under, over, and around the pipe. Minimum depth and width shall be as described above, and depth over the pipe bell or barrel shall

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be a minimum of six (6") inches, unless other depths and widths are shown on the contract drawings.

Concrete for cradle or encasement shall be Class B (2500 psi) unless otherwise called for on the contract plans.

For pay purposes, concrete used to support pipe stubs or pipe at manholes or concrete used in manholes shall not be considered as concrete in sewer or water main trenches.

H. 4" and 6" Sanitary Sewer Lines

4" and 6" lines shall be connected to the sewer main by means of a wye, tee, or saddle fitting, with the branch being the same size as the new service line. The fittings shall be elevated as directed, and one-eighth bends shall be used to connect the service line to the fitting as shown on the Plans. The typical house service details on the Contract Plans show the manner in which services are connected for normal-depth sewers. New service lines shall be installed to the property line, or as directed by the ENGINEER, and securely plugged. A 2x4 (inch) creosoted stake (projecting a minimum of two (2) feet above finished grade) shall be securely placed at the end of each service line.

Plugged service fittings shall be installed where directed. Plugs shall be compatible with the type of fitting installed and capable of passing the hydraulic and/or air testing requirements for sewers.

House services shall be installed at a minimum slope of one (1) percent (1/8 inch per foot), unless otherwise directed by the ENGINEER.

The distance between external cleanouts (and between a cleanout and the end of the pipe) in a sewer lateral shall not be more than 100 feet.

3.03 INSPECTION AND TESTING

A. Inspection and Testing

All gravity sewers shall be tested by the Low Pressure Air Test Method in accordance with "Uni-Bell's" Recommended Practice for Low Pressure Air Testing of Installed Sewer Pipe (UNI-B-6). This method of testing shall apply to all pipe materials and pipe diameters.

In addition, if the air test on a section of sewer is marginal (as to passing), the ENGINEER can order a corroborative hydrostatic test on the section in question.

Flexible sewer pipe, such as PVC, shall also be subject to deflection testing, as described further on in this section. Costs for all types of testing shall be incorporated in the unit price bid for the pipe.

1. Direct Measure of Infiltration

N/A

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POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

2. Direct Measure of Exfiltration

Manholes and piping shall be hydrostatically tested. A tolerance of less than 1 inch of water lost per manhole per 24 hours will be accepted.

3. Low Pressure Air Testing

Test pressure method (1 psi or 0.5 psi) shall be determined by the ENGINEER. Standard practice is to use the 1 psi test method.

Air testing for acceptance shall not be performed until the backfilling has been completed.

All sections of pipelines shall be cleaned and flushed prior to testing.

When groundwater is present the average test pressure of 3 psig shall be above any back pressure due to the groundwater level.

The maximum pressure allowed under any condition in air testing shall be 10 psig. The maximum groundwater level for air testing is 13 feet above the top of the pipe.

The equipment required for air testing shall be furnished by the CONTRACTOR and shall include the necessary compressor, valves and gauges to allow for the monitoring of the pressure, release of pressure and a separate test gauge.

The test gauge shall be sized to allow for the measuring of the one psig loss allowed during the test period and shall be on a separate line to the test section.

Air shall be supplied slowly to the plugged pipe segment until the internal air pressure reaches 4.0 psi greater than the average back pressure of any groundwater that may submerge the pipe. Pressure shall not exceed 9.0 psi. At least two minutes shall be allowed for temperature stabilization before proceeding further. Once the pressure has stabilized between 4.0 psi and 3.5-psi timing shall commence.

The pipeline shall be considered acceptable if the time interval for the 1.0-psi pressure drop is not less than the holding time listed in the Air Test Tables on the following pages.

Air testing shall be no sooner than two weeks after the installation of the sewer mains, nor one week prior to pavement restoration over the sewers, except as approved by the ENGINEER in writing.

Areas that are extremely wet (which require wellpointing for the proper installation of sewers) shall be air tested before the dewatering operations are terminated.

The sewers shall be left clean and free from lumps, protruding joint material, etc. and be ready for use. Each section of sewer between manholes shall show, from either end, a full circle of light.

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All tests shall be made by the CONTRACTOR, in the presence of the ENGINEER. The expense of the above tests shall be borne by the CONTRACTOR and be included in the unit prices bid for the sewer, under each respective size and depth of cut.

If, after tests have been conducted and accepted, the pipe has been disturbed or broken, or any damage to the pipe is suspected, the ENGINEER may require additional testing to be conducted at the expense of the CONTRACTOR. Consequently, pipe shall be cleaned before the final testing is conducted.

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4. Air Test Table

Based on equations from Uni-Bell's Recommended Practice for Low Pressure Air Testing of Installed Sewer Pipe (UNI-B-6):

AIR TEST TABLE I

SPECIFICATION TIME REQUIRED FOR A **1.0 PSIG PRESSURE DROP**
FOR SIZE AND LENGTH OF PIPE INDICATED FOR Q=0.0015

Pipe Diameter (in.)	Minimum Time (min:sec)	Length for Minimum Time (ft)	Time for Longer Length (sec)	Specification Time for Length (L) Shown (min:sec)							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	3:46	597	.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	.854L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27	25:30	88	17.306L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48
30	28:20	80	21:366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53
36	34:00	66	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46

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POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

AIR TEST TABLE II

SPECIFICATION TIME REQUIRED FOR A **0.5 PSIG PRESSURE DROP**
FOR SIZE AND LENGTH OF PIPE INDICATED FOR Q = 0.0015

Pipe Diameter (in)	Minimum Time (min:sec)	Length for Minimum Time (ft)	Time for Longer Length (sec)	Specification Time for Length (L) Shown (min:sec)							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	1:53	597	.190 L	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53
6	2:50	398	.427 L	2:50	2:50	2:50	2:50	2:50	2:50	2:51	3:12
8	3:47	298	.760 L	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:42
10	4:43	239	1.187 L	4:43	4:43	4:43	4:57	5:56	6:55	7:54	8:54
12	5:40	199	1.709 L	5:40	5:40	5:42	7:08	8:33	9:58	11:24	12:50
15	7:05	159	2:671 L	7:05	7:05	8:54	11:08	13:21	15:35	17:48	20:02
18	8:30	133	3.846 L	8:30	9:37	12:49	16:01	19:14	22:26	25:38	28:51
21	9:55	114	5.235 L	9:55	13:05	17:27	21:49	26:11	30:32	34:54	39:16
24	11:20	99	6.837 L	11:24	17:57	22:48	28:30	34:11	39:53	45:35	51:17
27	12:45	88	8.653 L	14:25	21:38	28:51	36:04	43:16	50:30	57:42	46:54
30	14:10	80	10.683L	17:48	26:43	35:37	44:31	53:25	62:19	71:13	80:07
33	15:35	72	12.926 L	21:33	32:19	43:56	53:52	64:38	75:24	86:10	96:57
36	17:00	66	15.384 L	25:39	38:28	51:17	64:06	76:55	89:44	102:34	115:23

- A. The CONTRACTOR shall exercise care when transporting, handling and placing PVC pipe and fittings, such that they will not be cut, kinked, twisted, or otherwise damaged.
- B. Ropes, fabric or rubber-protected slings and straps shall be used as necessary when handling PVC pipe. Slings, straps, etc. shall not be positioned at joints. Chains, cables or hooks shall not be inserted into the pipe ends as a means of handling pipe.
- C. Pipe or fittings shall not be dropped onto rocky or unprepared ground. Under no circumstances shall pipe or fittings be dragged over sharp and cutting objects.

SECTION 02720
POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

- D. PVC pipe shall be stored on clean level ground, preferably turf or sand, free of sharp objects which could damage the pipe. Stacking shall be limited to a height that will not cause excessive deformation of the bottom layers of pipes under anticipated temperature conditions. Where necessary, due to ground conditions, the pipe shall be stored on wooden sleepers, spaced suitably and of such width as not to allow deformation of the pipe at the point of contact with the sleeper or between supports. The pipes should be stored out of direct sunlight.
- E. The maximum allowable depth of cuts, gouges or scratches on the exterior surface of PVC pipe or fittings is 10 percent of the wall thickness. The interior of the pipe and fittings shall be free of cuts, gouges and scratches. Sections of pipe with excessive cuts, gouges or scratches shall be removed and the ends of the pipe rejoined at no cost to the OWNER.

END OF SECTION

SECTION 02821
CHAIN LINK FENCE

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall provide all labor, materials, equipment and supervision necessary to install PVC coated chain link fence as shown and specified.

1.02 REFERENCES

- A. Comply with ASTM A 53 for requirements of Schedule 40 piping.

1.03 DEFINITIONS

- A. Height of Fence: Distance measured from the top of concrete footing to the top of fabric.

1.04 SUBMITTALS

- A. Shop Drawings: Complete detailed drawings for fence and gate required. Include separate schedule for each listing all materials required and technical data such as size, weight, and finish, to ensure conformance to specifications.
- B. Product Data: Manufacturer's catalog cuts, specifications, and installation instructions for each item specified.
- C. Quality Control Submittals:
 - 1. Certificates: Affidavit required under Quality Assurance Article.

1.05 QUALITY ASSURANCE

- A. Comply with standards of the Chain Link Fence Manufacturer's Institute.
- B. Provide steel fence and gate as a complete compatible system including necessary erection accessories, fittings, and fastenings.
- C. Posts and rails shall be continuous without splices.

SECTION 02821
CHAIN LINK FENCE

PART 2 PRODUCTS

2.01 CHAIN LINK FENCE

- A. End Posts, Corner Posts and Pull Posts:
 - 1. 3" O.D. SS-30 Pipe Post, 3.81 lbs. per foot.
 - 2. Concrete footing: 12" diameter, 48" depth
- B. Line Posts:
 - 1. 2-1/2" O.D. SS-30 Pipe Post, 2.78 lbs. per foot
 - 2. Maximum spacing 10' on center
 - 3. Concrete footing: 10" diameter, 48" depth
- C. Gate Posts:
 - 1. 4" O.D. SS-30 Pipe Post, 5.78 lbs. per foot
 - 2. Concrete footing: 18" diameter, 48" depth
- E. Gates:
 - 1. Welded Framework of 2" SS-30, 2.01 lbs. per foot
Brace and truss as necessary, fabric to match fencing
 - 2. Concrete footing: 18" diameter, 48" depth
- F. Top Rail:
 - 1. 1-5/8" O.D. SS-30 Pipe, 1.9 lbs. per foot
 - 2. Top rail 21' in length with one edge swedged
- G. Bracing:
 - 1. Terminal posts braced and trussed to the nearest line post with 1-5/8" O.D. SS-30 pipe and 3/8" galvanized steel truss rod and truss rod tightener
- H. Tension Wire:
 - 1. 7 gauge, galvanized coil wire, secured at each terminal post and fastened to bottom of fence using hog rings
- I. Fittings:
 - 1. Beveled brace band and carriage bolt, Male combo rail end, pressed steel loop cap, pressed steel dome cap, 3/16" x 3/4" tension bar, beveled tension band and carriage bolt
 - 2. 8-1/4" 9 gauge aluminum tie wire and 6-1/2" 9 gauge aluminum tie wire spaced 15" OC for line posts and 24" OC for rails
- J. Height:
 - 1. See Contract Drawings.

2.02 STEEL FABRIC

SECTION 02821
CHAIN LINK FENCE

- A. One-piece widths.
- B. Chain link, 2 inch mesh, No. 9 gauge
- C. Selvages: Top edge twisted; bottom edge knuckled.

PART 3 EXECUTION

3.01 PREPARATION

- A. Clear and grub along fence line as required to eliminate growth interfering with alignment.
- B. Do not begin installation of fence in areas to be cut until finished grading has been completed.

3.02 INSTALLATION

- A. Space posts equidistant in the fence line with a maximum of 10 feet on center.
- B. Setting Posts in Earth: Drill holes for post footings. If existing grade at the time of installation is below finished grade, provide spiral paper tubes to contain concrete to finish grade elevation. Set posts in center of hole and fill hole with concrete. Plumb and align posts. Vibrate or tamp concrete for consolidation. Finish concrete in a dome shape above finish grade elevation to shed water. Do not attach fabric to posts until concrete has cured a minimum of 7 days.
- C. Setting Posts in Rock: Drill holes into solid rock one inch wider than post diameter, 18 inches deep for end, pull, corner, and gate posts, and 12 inches deep for line posts. Set posts into holes and fill annular space with shrink-resistant grout.
- D. Locate corner posts at corners and at changes in direction. Use pull posts at all abrupt changes in grade and at intervals no greater than 500 feet. On runs over 500 feet, space pull posts evenly between corner or end posts. On long curves, space pull posts so that the strain of the fence will not bend the line posts.
- E. Install top rail continuously through post tops or extension arms, bending to radius for curved runs. Install expansion couplings as recommended by fencing manufacturers.
- F. Install bottom and intermediate rails in one piece between posts and flush with post on fabric side using special offset fittings where necessary.
- G. Brace corner posts, pull posts, end posts, and gate posts to adjacent line posts with horizontal rails.
- H. Diagonally brace corner posts, pull posts, end posts, and gate posts to adjacent line posts with truss rods and turnbuckles.

SECTION 02821
CHAIN LINK FENCE

- I. Attach fabric to security side of fence. Maintain a 2 inch clearance above finished grade except when indicated otherwise. Thread stretcher bars through fabric using one bar for each gate and end post and 2 for each corner and pull post. Pull fabric tight so that the maximum deflection of fabric is 2 inches when a 30 pound pull is exerted perpendicular to the center of a panel. Maintain tension by securing stretcher bars to posts with metal bands spaced 15 inches oc. Fasten fabric to steel framework with wire ties spaced 15 inches oc for line posts and 24 inches oc for rails and braces. Bend back wire ends to prevent injury. Tighten stretcher bar bands, wire ties, and other fasteners securely.
- J. Position bolts for securing metal bands and hardware so nuts are located opposite the fabric side of fence. Tighten nuts and cut off excess threads so no more than 1/8 inch is exposed. Peen ends to prevent loosening or removal of nuts.
 - 1. Secure post tops and extension arms with tamper-resistant screws.
- K. Install gates plumb and level and adjust for full opening without interference. Install ground-set items in concrete for anchorage, as recommended by fence manufacturer. Adjust hardware for smooth operation and lubricate where necessary.
- L. Tension Wire: Support bottom edge of fabric with tension wire. Weave tension wire through fabric or fasten with hog rings spaced 24 inches oc.
- M. Protective Electrical Ground.
 - 1. Ground continuous fence at intervals not exceeding 500 ft in urban areas and 1000 ft)in rural areas. Ground within 100 ft of gates in each section of fence adjacent to gate.
 - 2. Ground fence under power line by three grounds, one directly under crossing and one on each side 25 ft to 50 ft away.
 - 3. Connect ground wire to fabric and ground rod by mechanical clamp of cast bronze body and bronze or stainless steel bolts and washers.
- N. Wire brush and repair welded and abraded areas of galvanized surfaces with one coat of cold galvanizing compound.
- O. Restore disturbed ground areas to original condition. Topsoil and seed to match adjacent areas.

END OF SECTION

SECTION 02925
VEGETATIVE MEASURES FOR EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, tools, supervision, transportation, installation equipment, and incidentals required to provide vegetative measures for erosion and sediment control. Work will include applying fertilizer, applying seed and mulch and maintaining all seeded areas as specified herein and as shown on the Drawings.
- B. The work shall include fertilizing, seeding and mulching for those areas shown on the Drawings and all areas disturbed by the Contractor. This Specification assumes that the method of seeding will be hydroseed. Alternative methods of seeding may be used based on prior approval of the Owner.
- C. Contractor's schedule for seeding and mulching shall be sequenced such that seeding is completed in time to provide maximum growth during this construction season.

1.02 REFERENCE STANDARDS

- A. All work for this section shall be performed in strict accordance with "New York State Standards and Specifications for Erosion and Sediment Control", NYSDEC, August 2005 or most recent edition, (i.e., Standards). The Standards are incorporated herein by reference.

1.03 SUBMITTALS

- A. Topsoil borrow source name/address and pre-qualification analysis, if off-site material is required.
- B. Manufacturer's Certificate of Compliance for seed and fertilizer mixtures
- C. Procedure for applying vegetative stabilization
- D. Wood cellulose fiber contents and manufacturer name
- E. Seeding and Fertilizing Schedule

PART 2 PRODUCTS

2.01 MATERIALS

- A. Off-Site Topsoil
 - 1. Topsoil shall be of high quality containing approximately 1/3 humus, 1/3 sand and 1/3 loam.
 - 2. Topsoil shall have at least 20 percent fine textured material (passing the No. 200 sieve) and not more than 15 percent clay.
 - 3. Topsoil treated with soil sterilants, pesticides, insecticides or herbicides shall not be used.
 - 4. Topsoil shall be relatively free of stones over 1-1/2 inches diameter, trash, noxious weeds such as nutsedge and quackgrass, and will have less than 10 percent gravel by volume.
 - 5. Topsoil containing soluble salts greater than 500 ppm shall not be used.
 - 6. Furnished topsoil shall be fertile, friable, natural topsoil typical of the topsoil of the locality, and shall be obtained from a well-drained site that is free of flooding and from which no topsoil has previously been stripped. The area from which topsoil is to be taken shall possess

SECTION 02925
VEGETATIVE MEASURES FOR EROSION AND SEDIMENT CONTROL

such uniformity of soil, depth, color, and other characteristics to offer assurance that when removed in commercial quantities that the soil shall be homogeneous in nature and shall meet the requirements of this Section. Topsoil shall not be delivered to the site or used while in a frozen or muddy condition. Topsoil as delivered to the site shall have a pH between 6.0 and 7.6. Lime shall be applied and incorporated with the topsoil as indicated by testing and as directed by the Owner before the topsoil is delivered to the working area.

B. Fertilizer

1. Fertilizer shall be standard commercial grade fertilizer meeting the requirements of all State and Federal regulations and standards of the Association of Office Agricultural Chemists. Fertilizer shall be delivered to the site in original, properly labeled, unopened, clean, containers each showing the manufacturer's guaranteed analysis conforming to applicable fertilizer regulations and standards. Fertilizer shall be 10-10-10, unless otherwise approved by the Owner or specified in the Contract Documents.

C. Seed

1. Seed shall be labeled in accordance with USDA Rules and Regulations under the Federal Seed Act and applicable State seed laws. Seed shall be furnished in sealed bags or containers bearing the date of the last germination, which date shall be within a period of 6 months prior to commencement of seeding operations. No seed shall be used unless properly labeled and no seed shall be used after its date of expiration. Seed shall be from same or from the previous year's crop; each variety of seed shall have a purity of not less than 85%, a percentage of germination not less than 80%, shall have a weed seed content of not more than 1% and contain no noxious weeds. The above percentages are by weight.
2. Except where noted on plans, the seed shall be furnished and delivered premixed pursuant to the Mix # 6 in the "New York State Standards and Specifications for Erosion and Sediment Control" (NYSDEC, August 2005 or most recent edition) specification for Permanent Critical Area Plantings or other applicable seed mixture specified in the NYSDEC "Permanent Critical Area Plantings" specification. A manufacturer's certificate of compliance to the specified mixes shall be submitted by the manufacturer for each seed mix. These certificates shall include the guaranteed percentages of purity for each type of seed in the mix, weed content, and germination of the seed, and also the net weight and date of shipment. No seed may be sown until the Contractor has submitted the certificates.

D. Mulch

1. Mulch shall comply with the "New York State Standards and Specifications for Erosion and Sediment Control" (NYSDEC, August 2005 or most recent edition) specification for Mulching.
2. Mulches shall not contain sticks larger than 1/4-inch diameter or other materials that could prevent matting during application. No mulch shall be used within 48 hours after cutting. Mulch shall be free from mold and other objectionable material and shall be in an air-dry condition suitable for placing with mulch blower equipment.
3. Wood fiber mulch for anchoring shall be wood cellulose processed into a uniform fibrous physical state. Wood cellulose fiber shall contain a green dye that will provide easy visual inspection for uniformity of the slurry spread. The wood cellulose fiber, including dye, shall contain no growth or germination-inhibiting properties. It shall be manufactured in such a manner that, after addition and agitation in slurry tanks with water, the fibers in the material

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VEGETATIVE MEASURES FOR EROSION AND SEDIMENT CONTROL

become uniformly suspended to form a homogeneous material. When sprayed over straw mulch, the material shall allow absorption and percolation of moisture. The manufacturer shall submit a certificate that the wood cellulose fiber meets the following requirements:

<u>Quantity</u>	<u>Specification Limit</u>
Particle Length	0.375 inch maximum
Particle Thickness	0.047 inch maximum
Net Dry Weight Content	minimum stated on bag
pH	4.0 to 8.5
<u>Quantity</u>	<u>Specification Limit</u>
Ash Content	1.6% maximum
Water Holding Capacity	90% minimum

The material shall be delivered in packages of uniform weight and bear the name of the manufacturer, the net weight, and a supplemental statement of net weight content.

4. Alternative mulches and anchoring materials meeting the requirements of the New York Standards and Specifications are acceptable, subject to approval by the Owner.

PART 3 EXECUTION

3.01 APPLICATION

- A. For all areas to be permanently seeded, the following steps shall be implemented.
 1. Topsoil shall be applied as specified in 3.02(A), below.
 2. Fertilizer shall be applied at a minimum rate of 600 pounds per acre. Fertilizer shall be disced into topsoil surfaces to a depth of 3 to 5 inches.
 3. Mulch will be applied at a rates specified in the "New York State Standards and Specifications for Erosion and Sediment Control" (NYSDEC, August 2005 or most recent edition) specification for Mulching. Also, lime will be applied, if needed, at the rates determined by the Owner based on results of soils tests.
 4. As an alternative to seeding and mulching, hydroseeding may be performed using mixture of seed/fertilizer (at previously defined application rates) and wood fiber cellulose (at a rate of 2000 pounds per acre). The wood cellulose fiber shall be mixed with water at a maximum rate of 50 pounds of wood cellulose fiber per 100 gallons. The Contractor is responsible for cleaning all structures and paved areas of unwanted deposits of the hydroseed mixture.
- B. For all areas to be temporarily seeded, the same steps shall be implemented except that neither topsoil nor fertilizer shall be used, unless otherwise approved by the Engineer.

3.02 INSTALLATION

- A. Where topsoil is required, it shall be applied as follows.
 1. The Contractor shall maintain previously established elevations and grades, as shown on the Drawings in a true and even condition.

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VEGETATIVE MEASURES FOR EROSION AND SEDIMENT CONTROL

2. The subgrade shall be raked and all rubbish, sticks, roots, and stones larger than 6 inches shall be removed. Subgrade surfaces shall be raked or otherwise loosened immediately prior to being covered with topsoil. Before placement of topsoil, all construction work in the immediate area shall have been completed.
 3. Topsoil shall be uniformly placed over approved areas and lightly rolled. No topsoil shall be spread in water or while frozen or muddy.
 4. Lime shall be applied to topsoil in a preparation area at the rates indicated by soil testing to bring the topsoil pH to a range of 6.0 to 7.6. Lime may not be mixed with fertilizer for application. Lime shall be mixed/spread evenly throughout the topsoil.
 5. After topsoil has been spread, it shall be carefully prepared by scarifying or harrowing and hand raking. All stiff clods, lumps, roots, litter and other foreign material shall be removed from the area and disposed of by the Contractor. During the preparation efforts, all depressions caused by settlement or debris removal voids shall be filled with additional topsoil and the surface shall be regraded until a smooth and even finished grade is created.
 6. The Contractor shall maintain the specified depth of topsoil from the time it is placed until seeding and securing of the mulch are completed.
- B. No seeding shall be done on frozen ground or when the temperature is 32°F or lower. Schedules for seeding and fertilizing must be submitted to the Owner for approval prior to beginning the work. Seeding shall be done within twenty-four hours following soil preparation. Mulch materials shall be applied on seeded areas immediately after seeding.
- C. Before seeding, all gullies, washes, or disturbed areas that develop subsequent to final dressing of topsoil shall be repaired. All areas shall be loosened by discing, harrowing, or other approved methods immediately prior to seeding. For areas flatter than 3 horizontal:1 vertical (3:1), the topsoil shall be loosened to a depth of 3 inches. For areas 3:1 and steeper, the topsoil shall be loosened to a depth of 1 inch.
- D. In order to prevent unnecessary erosion of newly topsoiled and graded slopes and unnecessary siltation of drainage ways, the Contractor shall develop a seeding schedule such that temporary or permanent seeding and mulching in disturbed areas that are not under active excavation will be completed as soon as practicable in areas of the site where stabilization has temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased, unless earth-disturbing activities will be resumed within twenty-one days. Exceptions include slopes greater than 10 percent and wetland areas, which will be stabilized within one-work day following cessation of activity. When protection of newly topsoiled and graded areas is necessary at a time which is outside of the normal seeding seasons, the Contractor shall protect those areas by whatever means necessary, as approved by the Owner, and shall be responsible for prevention of siltation in the areas beyond the limit of work.
- E. All utility line trenches will be backfilled at the end of each workday.

3.03 MAINTENANCE, AND PROVISIONAL ACCEPTANCE

SECTION 02925
VEGETATIVE MEASURES FOR EROSION AND SEDIMENT CONTROL

- A. The Contractor shall keep all seeded areas watered and in good condition, reseeding all seeded areas if and when necessary until a good, healthy, uniform growth is established over the entire area seeded. The Contractor shall maintain all temporarily seeded areas in an approved condition throughout the project and shall maintain permanently seeded areas for a period of one calendar year after the date of Owner's acceptance of the work.
- B. The permanently seeded and fertilizer areas will be inspected to verify that the grass has successfully been established based on the following criteria.
 - 1. No bare spots exist larger than one square foot.
 - 2. No more than 5 percent of total area has bare spots.
 - 3. Any areas not meeting these criteria shall be reseeded and/or refertilized by the Contractor at no extra cost to the Owner until all seeded areas meet these criteria.

END OF SECTION

SECTION 02931
STRUCTURAL MEASURES FOR EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, tools, supervision, transportation, installation equipment, and incidentals required to provide structural measures for erosion and sediment control during and upon completion of construction as specified herein and as shown on the Drawings.
- B. The work shall include construction and maintenance of temporary and permanent erosion control structures for those areas shown on the Drawings and all areas disturbed by the Contractor. The work will include, but is not necessarily limited to installation and maintenance of the following structural measures:
 - 1. silt fencing
 - 2. stone check dams
 - 3. culvert inlet protection
 - 4. Erosion control blankets (temporary and permanent)
 - 5. stone & block drop inlet protection
 - 6. curb drop inlet protection
 - 7. grate filters (inlet)
 - 8. HDPE culvert inlet protection
 - 9. Combo silt fence/check dam inlet protection
- C. Contractor is responsible to control all run-off from the work areas in a manner consistent with Section 01560

1.02 REFERENCE STANDARDS

- A. All work for this section shall be performed in strict accordance with "New York State Standards and Specifications for Erosion and Sediment Control", NYSDEC, August 2005 or most recent edition, (i.e., Standards). The Standards are incorporated herein by reference.
- B. Selected materials specified in Section 2.01 below shall meet the material requirements of the "New York State Standards and Specifications for Erosion and Sediment Control", NYSDEC, August 2005 or most recent edition.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Silt Fence Fabric
 - 1. Silt fence fabric shall be woven and consist of monofilaments of polypropylene treated with ultraviolet light stabilizers. The fabric shall have sleeves through which either steel or 2-inch square wood posts can be inserted.
 - 2. Silt fence fabric shall be inert to chemicals commonly found in soils and to hydrocarbons.

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STRUCTURAL MEASURES FOR EROSION AND SEDIMENT CONTROL

3. Silt fence fabric shall be resistant to mildew, rot, insects, and rodent attack.
4. Silt fence fabric shall conform to the following test criteria:

<u>Property</u>	<u>Unit</u>	<u>Test Method</u>	<u>Minimum Accepted Value</u>
Grab Strength	lbs	ASTM D 1682	90
Elongation at Failure	%	ASTM D 1682	50 (max.)
Mullen Burst Strength	psi	ASTM D 3786	200 (min)
AOS	U.S. Sieve No.	ASTM D 4751	60 - 80
Ultraviolet Stability	%	ASTM D 4355	90
Puncture Strength	lbs	ASTM D 4833	100
Slurry Flow Rate	gal/min/sq.ft	ASTM D 4151	0.3

B. Silt Fence Posts

1. Wood shall be composed of sound quality hardwood with a minimal cross section area of 3.0 square inches.
2. Wood posts shall be a minimum of 36 inches.
3. Steel posts shall be standard T & V section weighing not less than 1.00 pound/linear foot.

C. Check Dams

1. Height shall not greater than two (2) feet. Center shall be maintained nine (9) inches lower than abutments at natural ground elevation.
2. The check dams shall be spaced as necessary in the channel so that the crest of the downstream dam is at the elevation of the toe of the upstream dam.
3. Stone Size : use graded stone 2 to 15 inches in size. NYSDOT Light Stone Fill meets these requirements.

D. Erosion Control Blankets

1. Temporary biodegradable erosion control blankets for slopes 1:1 and greater shall be North American Green C125BN or equivalent or as specified in the Stormwater Pollution Prevention Plan
2. Temporary biodegradable erosion control blankets for slopes 3:1 and 2:1 shall be North American Green S150 or equivalent or as specified in the Stormwater Pollution Prevention Plan.

E. Inlet Protection

1. Refer to Appendix E on standard and specifications.

2.02 QUALITY CONTROL

- A. Contractor shall provide manufacturer's certificates for Silt Fence.

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STRUCTURAL MEASURES FOR EROSION AND SEDIMENT CONTROL

PART 3 EXECUTION

3.01 SILT FENCE

- A. Silt fence shall be installed as shown on the Drawings, in the locations shown on the Drawings and down slope of any area before disturbance by construction activities. As shown on the Drawings, the silt fence fabric panels shall be installed loosely with adjacent panels overlapped a minimum of 12 inches. Silt fence material shall be embedded at least 6 in. beneath ground surface and shall extend upward at least 16 in. above the disturbed area ground surface. The top edge of the fabric shall be reinforced or shall have a 1 inch tuck.
- B. Accumulated silt and debris shall be removed by the Contractor from behind the face of the silt fence when the silt deposits reach approximately one third the height of the fence. Clogged or damaged fabric shall be immediately replaced.

3.02 CHECK DAM MAINTENANCE

- A. The check dams should be inspected after each runoff event. Correct all damage immediately. If significant erosion has occurred between structures a liner of stone or other suitable material should be installed in that portion of the channel.
- B. Remove sediment accumulated behind dam as needed to allow channel to drain though the stone check dam and prevent large flows from carrying sediment over the dam, replace stones as needed to maintain the design cross section of the structures.

3.03 EROSION CONTROL BLANKETS

- A. Installed pursuant to manufactures recommendations.

3.04 INLET PROTECTION

- A. The inlet protection structure should be inspected after each runoff event. Correct all damage immediately.
- B. Remove sediment accumulated behind the inlet protection structure as needed. Replace stones as needed. Check materials for proper anchorage and secure as necessary.

3.06 PROVISIONS FOR EROSION CONTROL DURING CONSTRUCTION

- A. Contractor shall implement erosion control measures around all areas to be disturbed prior to disturbing ground in the area, to the satisfaction of the Owner. The Engineer will routinely inspect erosion control structures to confirm that Contractor is maintaining these features.
- B. The Contractor shall take sufficient precautions during construction to minimize the run-off of polluting substances such as silt, clay, wastes, fuels, oils, bitumens, and calcium chloride into surface waters. Special precautions shall be taken in the use of construction equipment to prevent operations that promote erosion.

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STRUCTURAL MEASURES FOR EROSION AND SEDIMENT CONTROL

- C. The temporary drainage ditches, silt fences, and other erosion and sedimentation control features shall be maintained in the locations shown on the Drawings and at other incidental locations identified by the Owner or Engineer.
- D. Disposal of drainage from the site shall be at a location approved by the Owner. Under no circumstances whatsoever shall drainage be pumped, discharged, or otherwise allowed to leave the site until silt and other sedimentary materials have been removed according to the erosion and sediment control measures described in these specifications. Particular care shall be taken to prevent the discharge of unsuitable drainage to wetland areas.

END OF SECTION

SECTION 02950
DEWATERING

PART 1 – GENERAL

1.1 DESCRIPTION

- A. This section specifies performance of dewatering required to lower and control ground water table levels and hydrostatic pressures to permit excavation, backfill, and construction to be performed in the dry. Control of surface water shall be considered as part of the work under this specification.

1.2 RELATED SECTIONS

- A. Section 02221 – Trenching and Excavation
- B. Section 02200 – Earthwork
- C. Geotechnical Report

1.3 SUMMARY

- A. The work to be completed by the CONTRACTOR includes, but is not necessarily limited to the following:
 - 1. Dewater excavations, including seepage and precipitation.
- B. The CONTRACTOR shall be responsible for providing all materials, equipment, labor, and services necessary for management of water and erosion control.

1.4 SUBMITTALS

- A. The CONTRACTOR shall submit the discharge locations from all dewatering operations and the method to ensure turbid free runoff to any receiving water course or water body.

1.5 REQUIREMENT

- A. Dewatering system shall be of sufficient size and capacity necessary to lower and maintain ground water table to an elevation at least 1 foot or AOB below lowest foundation subgrade or bottom of pipe trench and to allow material to be excavated in a reasonably dry condition. Materials to be removed shall be sufficiently dry to permit excavation to grades shown and to stabilize excavation slopes where sheeting is not required. Operate dewatering system continuously until backfill work has been completed.

SECTION 02950
DEWATERING

- B. Reduce hydrostatic head below any excavation to the extent that water level in the construction area is a minimum of 1 foot or AOB below prevailing excavation surface.
- C. Prevent loss of fines, seepage, boils, quick conditions or softening of foundation strata.
- D. Maintain stability of sides and bottom of excavation.
- E. Construction operations are performed in the dry.
- F. Control of surface and subsurface water is part of dewatering requirements. Maintain adequate control so that:
 - 1. The stability of excavated and constructed slopes are not adversely affected by saturated soil, including water entering prepared subbase and subgrades where underlying materials are not free draining or are subject to swelling or freeze-thaw action.
 - 2. Erosion is controlled.
 - 3. Flooding of excavations or damage to structures does not occur.
 - 4. Surface water drains away from excavations.
 - 5. Excavations are protected from becoming wet from surface water, or insure excavations are dry before additional work is undertaken.
- G. Contractor shall protect the Owner's storm sewers at all times and shall clean debris and repair any damage that occurs.
- H. Permitting Requirements: The contractor shall comply with all applicable Federal, State and County rules and regulations where the work is performed.

PART 2 - PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install a dewatering system to lower and control ground surface water in order to permit excavation, construction of structure, and placement of backfill materials to be performed under dry conditions. Make the dewatering system adequate to pre-drain the water-bearing strata above and below the bottom of structure foundations, utilities and other excavations.

SECTION 02950
DEWATERING

- B. In addition, reduce hydrostatic pressure head in water-bearing strata below structure foundations, utility lines, and other excavations, to extent that water levels in construction area are a minimum of 1 foot or AOBEL below prevailing excavation surface at all times.

3.2 OPERATION

- A. Prior to any excavation below the ground water table, place system into operation to lower water table as required and operate it until utilities and structures have been satisfactorily constructed, which includes the placement of backfill materials and dewatering is no longer required.
- B. Place an adequate weight of backfill material to prevent buoyancy prior to discontinuing operation of the system.

3.3 WATER DISPOSAL

- A. Dispose of water removed from the excavations in accordance with all regulatory requirements:
 - 1. Will not endanger portions of work under construction or completed.
 - 2. Will cause no inconvenience to others working near site.
 - 3. Will comply with the stipulations of required permits for disposal of water.
 - 4. Will Control Runoff: The CONTRACTOR shall be responsible for control of runoff in all work areas including but not limited to: excavations, access roads, parking areas, laydown, and staging areas. The CONTRACTOR shall provide, operate, and maintain all ditches, basins, sumps, culverts, site grading, and pumping facilities to divert, collect, and remove all water from the work areas. All water shall be removed from the immediate work areas and shall be disposed of.
 - a. Any turbid discharges from dewatering areas will be directed to either a settling tank or a stable, level, grassed area, at least 100 feet from watercourses and wetlands. If the discharge is directed to a stable, level vegetated area, the discharge and any related dewatering filter area will be surrounded by a silt curtain sediment barrier. Settling tanks and dewatering filter devices shall be of sufficient capacity to handle the discharge of the pumps such that the water returned to a stream is clear.

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DEWATERING

- b. No sewer pipes or manholes shall be used as dewatering and discharging devices without approval of the Engineer.
- c. The contractor will identify prior to the start of construction, discharge locations from all dewatering operations and the method to ensure turbid free runoff to any receiving water course or water body.

B. Excavation Dewatering:

- 1. The CONTRACTOR shall be responsible for providing all facilities required to divert, collect, control, and remove water from all construction work areas and excavations.
- 2. Drainage features shall have sufficient capacity to avoid flooding of work areas.
- 3. Drainage features shall be so arranged and altered as required to avoid degradation of the final excavated surface(s).
- 4. The CONTRACTOR shall utilize all necessary erosion and sediment control measures as described herein to avoid construction related degradation of the natural water quality.

C. Dewatering equipment shall be provided to remove and dispose of all surface and ground water entering excavations, trenches, or other parts of the work during construction. Each excavation shall be kept dry during subgrade preparation and continually thereafter until the structure to be built, or the pipe to be installed therein, is completed to the extent that no damage from hydrostatic pressure, flotation, or other cause will result.

3.4 STANDBY EQUIPMENT

- A. Provide complete standby equipment, installed and available for immediate operation, as may be required to adequately maintain de-watering on a continuous basis and in the event that all or any part of the system may become inadequate or fail.

3.5 CORRECTIVE ACTION

- A. If dewatering requirements are not satisfied due to inadequacy or failure of the dewatering system (loosening of the foundation strata, or instability of slopes, or damage to foundations or structures), perform work necessary for reinstatement of foundation soil and damaged structure resulting from such inadequacy or failure by CONTRACTOR, at no additional cost to OWNER.

SECTION 02950
DEWATERING

3.6 DAMAGES

- A. Immediately repair damages to adjacent facilities caused by dewatering operations.

END OF SECTION

SECTION 02955
TEMPORARY BYPASS PUMPING

PART 1 - GENERAL

1.1 SCOPE

- A. The Contractor is required to furnish all material, labor, equipment, power, maintenance, etc. to implement any temporary pumping systems required for the purpose of diverting existing flows around various work areas during the project.
- B. The design, installation and operation of the temporary pumping system shall be the Contractor's responsibility. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.

1. The pumping capacity that is needed at the Saw Mill Pump Station is 2,100 gpm total. If temporary pumping is used, the combined capacity of the installed pumps and the temporary pumps must equal 2,100 gpm. The pump station has two (2) 12-inch force mains that can be used for pumping the wastewater. Each of the existing electric pumps are rated for 900 gpm at 96 ft TDH. Static head is 57.5 feet.

1.2 SUBMITTALS

- A. The Contractor shall submit to the Engineer detailed plans and descriptions' outlining all provisions and precautions to be taken by the Contractor regarding the handling of existing wastewater flows. This plan must be specific and complete, including such items as schedules, locations, elevations, capacities of equipment, materials and all other incidental items necessary and/or required to ensure proper protection of the facilities, including protection of the access and bypass pumping locations from damage due to the discharge flows, and compliance with the requirements and permit conditions specified in these contract documents. No construction shall begin until all provisions and requirements have been reviewed by the Engineer.

The plan shall include but not limited to details of the following:

- B.1. Staging areas for pumps
- B.2. Number, size, material, location and method of Installation of suction piping
- B.3. Number, size, material, method of Installation and Location of installation of discharge piping
- B.4. Bypass pump sizes, capacity, number of each size to be on site and power requirements
- B.5. Calculations of static lift, friction losses, and flow Velocity (pump curves showing pump operating range shall be submitted)
- B.6. Downstream discharge plan
- B.7. Method of protecting discharge manholes or structures from erosion and damage
- B.8. Thrust and restraint block sizes and vent locations
- B.9. Any temporary pipe supports and anchoring required
- B.10. Design plans and computation for access to bypass pumping locations indicated on the drawings
- B.11. Calculations for selection of bypass pumping pipe size
- B.12. Schedule for installation of and maintenance of bypass pumping lines

SECTION 02955
TEMPORARY BYPASS PUMPING

B.13. Plan indicating selection location of bypass pumping line locations

1.3 EQUIPMENT

- A. All pumps used shall be centrifugal, end suction, fully automatic self-priming units that do not require the use of foot-valves or vacuum pumps in the priming system. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of effluent flows. The pumps shall not be hydraulic submersible type.
- B. The Contractor shall provide check valves to isolate each pump separately when using a common manifold.
- C. The Contractor shall include one back-up pump of each size to be maintained on site.
- D. Back-up pumps shall be on-line, isolated from the primary system by a valve, and be set up with auto start control to bring pumps on line automatically.
- E. Discharge Piping – in order to prevent the accidental spillage of flows all discharge systems shall be temporarily constructed of rigid pipe with positive, restrained joints. Under no circumstances will aluminum “Irrigation” type piping or glued PVC pipe be allowed. Discharge hose will only be allowed in short sections and by specific permission from the Engineer. Maximum velocities shall not exceed 10 ft/sec.
- F. Allowable piping materials will be quick disconnect galvanized steel pipe or fused, high-density polyethylene pipe as manufactured by Phillips Driscopipe, Inc. or equal.

1.4 SYSTEM DESCRIPTION – DESIGN REQUIREMENTS

- A. The Contractor is responsible for ensuring that the bypass pumping system is capable of meeting all flow requirements during the time at which the work is completed and of handling any additional flows resulting from inclement weather. The Contractor shall provide all pipeline plugs, pumps of adequate size to handle peak flow, and temporary discharge piping to ensure that the total flow of the main can be safely diverted around the section to be replaced. Bypass pumping system will be required to be operated 24 hours per day as needed.
- B. The Contractor shall have adequate standby equipment available and ready for immediate operation and use in the event of an emergency or breakdown. One standby pump for each size pump utilized shall be installed at the mainline flow bypassing locations, ready for use in the event of primary pump failure. The Contractor shall provide a 24 hour, 7 day per week contact name and phone number for emergencies.
- C. Bypass pumping system shall be capable of bypassing the flow around the work area and of releasing any amount of flow up to full available flow into the work area as necessary for satisfactory performances of work.

1.5 PERFORMANCE REQUIREMENTS

- A. It is essential to the operation of the existing sewerage system that there is no interruption in the flow of sewage throughout the duration of the project. To this end, The Contractor shall

SECTION 02955
TEMPORARY BYPASS PUMPING

provide, maintain and operate all temporary facilities such as dams, plugs, pumping equipment (both primary and back-up units as required), conduits, all necessary power, and all other labor and equipment necessary to intercept the sewage flow before it reaches the point where it would interfere with his work, carry it past his work and discharge it to a location that will allow for proper treatment and plant operational control.

- B. The design, installation and operation of the temporary pumping system shall be the Contractor's responsibility. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.
- C. The Contractor shall provide all necessary means to safely convey the sewage past the work area. The Contractor will not be permitted to stop or impede the main flows under any circumstances.
- D. The Contractor shall maintain sewer flow around the work area in a manner that will not cause surcharging of sewers, damage to sewers and that will protect public and private property from damage and flooding.
- E. The Contractor shall protect water resources, wetlands and other natural resources. No discharge of wastewater is allowed to the on-site storm drainage system.

1.6 FIELD QUALITY CONTROL AND MAINTENANCE

- A. Testing – The Contractor shall perform leakage and pressure tests of the bypass pumping discharge piping using clean water prior to actual operation pressure test must be 1.5 times system pressure. The Engineer will be given 48 hours notice prior to testing.
- B. Inspection – The Contractor shall inspect bypass pumping system every two hours to ensure that the system is working correctly.
- C. Maintenance Service – The Contractor shall insure that the temporary pumping system is properly maintained and a responsible operator shall be on hand at all times when pumps are operating.
- D. Extra Materials – Spare parts for pumps and piping shall be kept on site as required. Adequate hoisting equipment for each pump and accessories shall be maintained on the site.

1.7 PREPARATION

- A. Precautions – The Contractor is responsible for locating any existing utilities in the area the Contractor selects to locate the bypass pipelines. The Contractor shall locate his bypass pipelines to minimize any disturbance to existing utilities and shall obtain approval of the pipeline locations from the Engineer. All costs associated with relocating utilities and obtaining all approvals shall be paid by the Contractor.
- B. During all bypass pumping operations, the Contractor shall protect the pumping station and main and all local sewer lines from damage inflicted by any equipment. The Contractor shall be responsible for all physical damage to the pumping station and main and all local sewer lines caused by human or mechanical failure.

SECTION 02955
TEMPORARY BYPASS PUMPING

1.8 INSTALLATION AND REMOVAL

- A. The Contractor shall make connections to the existing sewer and construct temporary bypass pumping structures only at access locations approved by the Engineer and Owner.
- B. Plugging or blocking of sewage flows shall incorporate a primary and secondary plugging device. When plugging or blocking is no longer needed for performance and acceptance or work, it is to be removed in a manner that permits the sewage flow to slowly return to normal without surge, to prevent surcharging or causing other major disturbances downstream.
- C. When working inside manholes, treatment structures or piping systems, the Contractor shall exercise caution and comply with OSHA requirements when working in the presence of sewer gases, combustible or oxygen-deficient atmospheres, and confined spaces.
- D. The Contractor must protect the bypass pipelines from traffic damage. Upon completion of the bypass pumping operations, and after the receipt of written permission from the Engineer, the Contractor shall remove all piping, restore all property to pre-construction condition and restore all pavement. The Contractor is responsible for obtaining Owner's approval for placement of the temporary pipeline, prior to installation.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not used)

END OF SECTION

SECTION 02984
SITE RESTORATION AND LANDSCAPING

PART 1. GENERAL

1.01 SUMMARY

- A. The CONTRACTOR shall be responsible for the complete restoration of all areas affected by the construction operations.
- B. Work performed under this section shall include the furnishing of all labor, tools, equipment and materials necessary to completely restore all public and private property - in all areas disturbed by construction, and in other special areas of the project as may be designated by the ENGINEER or as shown on the plans - to a condition which is equal to or better than what existed prior to start of the contract. Incident restoration work includes, but is not limited to the following: signs-public or private, fencing poles, trees, shrubs and bushes, lawns and gardens, public and private utilities, drainage structures and ditches, retaining walls, foundation, slabs, dams and embankment ponds and similar water bodies.

1.02 QUALITY ASSURANCE

- A. CONTRACTOR shall take a complete set of photographs of all work areas prior to commencing work as required by the Supplemental General Requirements. CONTRACTOR shall supply the ENGINEER with one set of these photographs for documentation purposes including but not limited to restoration work.
- B. The contractor shall provide the ENGINEER with documentation that all material required under this item conforms to contract requirements. The contractor shall provide test results for the topsoil, tickets for seed mix, etc.

1.03 SUBMITTALS

- A. Preconstruction photographs submitted per Supplemental General Requirements.
- B. Documentation and test results for the topsoil, seed mix, lime, and fertilizer that demonstrate conformity with this specification section.

PART 2. PRODUCTS

2.01 MATERIALS

- A. In general, all existing materials removed or disturbed during construction shall be replaced with new materials of the same quantity as those disturbed during construction.
- B. Where existing materials or structures can be reused, such as signs, fencing, etc., the contractor shall carefully remove and replace the existing structures to the satisfaction of the individual owner, utility, and ENGINEER.
- C. Where materials are encountered that are no longer made and cannot be replaced with materials of similar quality, the contractor shall make every effort to preserve and reuse the existing materials.

SECTION 02984
SITE RESTORATION AND LANDSCAPING

2.02 TOPSOIL, PLANTINGS AND SEEDINGS

- A. Topsoil shall be of high quality containing approximately 1/3 humus, 1/3 sand and 1/3 loam. Topsoil shall be uniform and homogenous in composition and shall have a pH range of 6.0 to 7.6.
- B. Lime shall be agricultural limestone containing at least 88% calcium and magnesium carbonates and shall be obtained from quality manufacturers.
- C. Fertilizer shall be standard 10-10-10 fertilizer. Mulch shall be hay or straw free from noxious weeds.
- D. Replacement shrubbery shall be vigorous stock obtained from a reputable nursery of a size and shape to match existing. All replacement shrubbery shall be balled in burlap.
- E. Seed mix for lawns shall be as follows:
 - 1. 60% Kentucky Blue Grass
 - 2. 20% Redtop
 - 3. 20% Perennial Ryegrass
- F. Seed mix for open or wooded areas with slopes of less than one on three shall be as follows:
 - 1. 60% Red Fescue
 - 2. 15% Kentucky Bluegrass
 - 3. 20% Perennial Ryegrass
 - 4. 5% White Clover
- G. Seed mix for open or wooded areas with slopes greater than one on three shall be as follows:
 - 1. 30% Crown Vetch
 - 2. 70% Perennial Ryegrass
- H. Seed mix for stream banks and drainage swales shall be as follows:
 - 1. Tall Fescue (0.5 lbs/1000 square feet)
 - 2. Creeping Red Fescue (0.5 lbs/1000 square feet)
 - 3. Red Top (0.1 lbs per 1000 square feet)
- I. Temporary Seeding Mixture IF: Spring or summer or early fall, then seed the area with ryegrass (annual or perennial) at 30 lbs. per acre (Approximately 0.7 lb./1000 sq. ft. or use 1 lb./1000 sq. ft.). IF: Late fall or early winter, then seed Certified 'Aroostook' winter rye (cereal rye) at 100 lbs. per acre (2.5lbs./1000 sq. ft.).
- J. Hydroseeding of open or wooded areas shall be as approved by the ENGINEER.

PART 3. EXECUTION

3.01 INSTALLATION OF RESTORATION WORK

- A. Structures and plantings to be restored after completion of final grading shall be done in conformance with generally accepted practices skilled in the specific trade, equipment which is properly sized and designed to accomplish the specific task and scheduled to cause the least inconvenience and disruption to the property owner.
- B. CONTRACTOR shall be responsible for completing temporary stabilization to prevent erosion. Such temporary measures shall be included in the lump sum price for this item.
- C. CONTRACTOR is responsible for establishing vegetation on disturbed areas. To accomplish this, CONTRACTOR shall re-seed or replant as necessary and provide

SECTION 02984
SITE RESTORATION AND LANDSCAPING

fertilizers, lime, or additional soil amendments as may be needed to complete restoration.

- D. All final graded areas shall be approved by the ENGINEER prior to the initiation of the restoration activities.
- E. Seeding shall not be completed after October 15th without approval of the ENGINEER.
- F. As work proceeds and prior to seeding, CONTRACTOR shall remove all exposed stones and debris greater than 2 inches from surface of area to be seeded.
- G. Surface structures, which have been removed, shall be regraded with the appropriate backfill material, compacted and properly prepared for the new surface.
- H. Ditch lines shall be regraded and shaped generally to match existing and to provide proper drainage.
- I. Cleaning Up - After final restoration is complete, the contractor shall remove all excess excavated material, rubbish and debris all work areas and grass plots; and the whole shall be left in a neat and acceptable condition.

3.02 RESTORATION OF LAWN AREAS

- A. Lawn areas shall be graded to a depth of 6 inches below existing; removing all rocks, stones or stumps and the subsoil shall be scarified. CONTRACTOR shall supply and place six inches of topsoil over the subsoil so that no ridges or depressions occur. Topsoil shall be hand raked as necessary to blend with existing grades. Fertilizer at a rate of 25 pounds per 1,000 square feet and, if required, limestone shall be worked into the top two inches of topsoil. Seed shall then be spread at a rate of five pounds per 1,000 square feet.
- B. The surface shall then be raked and lightly rolled. Mulch shall then be placed to a depth of two to three inches. The contractor shall care for reseeded areas until final payment is made and until the lawn has reestablished itself.
- C. For slopes greater than approximately 10%, contractor shall supply and place erosion control fabric to aid in establishing grass. Fabric shall be completely bio-degradable within 2-years and shall be placed according to supplier specifications. CONTRACTOR shall include up to 5000 square feet of such mat for placement on site AOB.

3.03 RESTORATION OF OPEN AND WOODED AREAS

- A. Open or wooded areas shall be graded to the grades existing prior to disturbance, fertilized at a rate of 1,500 pounds per acre, limed at a rate of 2,000 pounds per acre, seeded at 70 pounds per acre, and mulched in the same manner as lawn areas. Topsoil will only be required if exceptionally barren soil is encountered.
- B. Sloped areas shall be prepared in the same manner as open or wooded areas using the seed specified for sloped areas.
- C. Shrubbery shall be planted in a pit at least 1-1/2 times the size of the root ball. Backfill for shrubbery shall consist of topsoil, peat moss, and fertilizer in the ratio of 7:1:1/4. All shrubbery shall be watered at the time of planting.

SECTION 02984
SITE RESTORATION AND LANDSCAPING

3.04 PLANTING OF TREES SHRUBS AND VINES

A. Plant Protection:

Prior to delivery, the trunk, branches, and foliage of the plants shall be sprayed with non-toxic antidesicant, applied according to the manufacturer's recommendations. This does not apply to state nursery seedlings.

B. Planting Time:

Deciduous trees and shrubs: April 1 to June 1 and October 15 to December 15.

Evergreen trees and shrubs: April 1 to June 1 and September 1 to November 15.

C. Spacing:

Plant all trees and shrubs well back from buildings to allow for mature crown size. The following are guides for planning:

Large trees: 50-60 feet apart.

Small trees: 20-30 feet apart Columnar species: 6-8 feet apart

Hedges: 1-4 feet apart

Shrubs: For clumps, plan spacing so mature shrubs will be touching or overlapping by only 1 or 2 feet.

D. Site Preparation:

1) Individual sites for planting seedlings can be prepared by scalping the sod away from a four foot square area where the seedling is to be planted.

2) All planting beds shall be cultivated to a depth of 8 inches, or chemically treated for weed control. Remove objectionable objects that will interfere with maintenance of site.

E. Planting:

1) Plants shall be located as shown on plans and/or drawings and, where necessary, located on the site by stakes, flags or other means.

2) The plants shall be set upright in holes.

3) All plants shall be thoroughly watered on the same day of planting. Plants that have settled shall be reset to grade.

F. Wrapping:

Immediately after planting, wrap deciduous tree trunks from the bottom to the first limb with a 4 inch wide bituminous impregnated, insect resistant tape or paper manufactured for that purpose. Tie with jute (bag strings) at top and bottom.

G. Mulching:

Mulch the disturbed area around individual trees and shrubs with a 4-inch layer of wood chips. Pull woodchips 1 inch away from the base of shrubs to avoid fungus development.

3.05 MOWING

CONTRACTOR shall perform one mowing of all areas restored under the project AOB.

END OF SECTION

02984-4

SECTION 03100
CONCRETE FORMWORK

PART 1. GENERAL

1.01 SUMMARY

- A. Furnish all labor, materials, equipment and incidentals required to design, install and remove formwork for cast-in-place concrete as shown on the drawings and as specified herein.
- B. Secure to forms or set for embedment all miscellaneous metal items, sleeves, reglets, anchor bolts, inserts, waterstops, fiberglass reinforced plastic components and other items furnished under other Sections and required to be cast into concrete.
- C. The General Contractor shall coordinate with other contractors as to inserting sleeves that are necessary to complete construction. The General Contractor shall be responsible for placement of such items for the other contractors.

1.02 RELATED WORK

- A. Section 03300 Cast-In-Place Concrete

1.03 SUBMITTALS AND TESTING

- A. Submit in accordance with Section 01300, shop drawings and product data showing materials of construction and details of installation for:
 - 1. Form release agent
 - 2. Form ties
 - 3. Form liners (if shown on drawings)

1.04 REFERENCE STANDARDS (Most Current Edition)

- A. American Concrete Institute (ACI)
 - 1. ACI 301 - Specifications for Structural Concrete for Buildings
 - 2. ACI 318 - Building Code Requirements for Reinforced Concrete
 - 3. ACI 347R - Guide to Formwork for Concrete
- B. American Plywood Association (APA)
 - 1. Material grades and designations as specified

1.05 DESIGN OF FORMS

- A. Structural design responsibility: Contractor shall provide all forms and shoring designed by a professional engineer registered in the State of New York. Design and erect formwork in accordance with the requirements of ACI 301 and ACI 318 and as recommended in ACI 347R. Comply with all applicable regulations and codes. Consider special requirements due to the use of plasticized and/or retarded set concrete.
- B. Review of the submitted materials will not relieve the Contractor of responsibility for the strength, safety, or correctness of methods used.
- C. Demonstrate to the Engineer on a designated area of the concrete substructure exterior surface that the form release agent will not impair the bond of paint, sealant, waterproofing, or other coatings and will not affect the forming materials.

SECTION 03100
CONCRETE FORMWORK

PART 2. PRODUCTS

2.01 MATERIALS

- A. Make forms for cast-in-place concrete of wood or steel, except as specified in Paragraphs 2.1B. Construct wood forms of sound lumber or plywood free from knotholes and loose knots. Construct steel forms to produce surfaces equivalent in smoothness and appearance to those produced by new plywood panels. Design and construct all forms to provide a flat, uniform concrete surface requiring no grinding, repairs, or finishing except as specified in Section 03345.
- B. Make forms for exposed (non-submerged) exterior and interior concrete of new and unused Plyform exterior grade plywood panels manufactured in compliance with the APA and bearing the APA trademark. Provide B grade or better veneer on all faces to be in contact with concrete.
- C. Provide rigid forms that will not deflect, move, or leak. Design forms to withstand the high hydraulic pressures resulting from rapid filling of the forms and heavy high frequency vibrations of the concrete. Limit deflection to 1/400 of each component span.
- D. Column forms shall have a 3/4" chamfer on all corners unless otherwise indicated.
- E. Form release agent shall be applied to all form surfaces that come in contact with concrete. The form agent shall be non-staining, non-residual, water based, and bond breaking. The form release agent shall not impair the bond of paint, sealant, waterproofing or other coatings.
- F. Form ties shall be as follows:
 - 1. Flat bar ties for panel forms shall have plastic or rubber inserts with a minimum depth of 1.5" and manufactured to permit patching of the tie hole.
 - 2. Wire ties shall be manufactured so that after removal of the projecting part, no metal remains within 1.5" of the face of the concrete. The part of the tie to be removed shall be provided with a plastic or wooden cone at least 1/2" diameter and 1.5" long. Provide cone washer type ties in concrete exposed to view or sewage.
 - 3. Provide ties for liquid containment structures and exterior below grade basement walls that have a steel waterstop tightly attached or have a neoprene rubber washer.

PART 3. EXECUTION

3.01 GENERAL

- A. Clean, fill and seal form tie holes with non-shrink cement grout.
- B. Provide forms for all cast-in-place concrete including the sides of footings. Construct and place forms to provide concrete of the shape, lines, dimensions and appearances indicated.
- C. Provide removable panels at the bottom of the forms for walls and columns to allow cleaning, inspection, and joint surface preparation. Provide closable intermediate inspection ports in forms for walls. Provide tremies, flexible hose, and hoppers for placement of concrete to prevent drops of greater than 5'-0" and to prevent accumulation of hardened concrete on forms and reinforcing above the freshly placed concrete.
- D. Place molding, bevels or other types of chamfer strips securely in forms.
- E. Provide rigid forms to withstand construction loads and vibration and remain within tolerance of deflection limits.

3.02 FORM PREPARATION

- A. Clean, repair, remove projecting nails and fill holes, and smooth protrusions on all form surfaces to be in contact with concrete before reuse.
- B. Coat wood forms in contact with concrete using a form releasing agent prior to form installation.

SECTION 03100
CONCRETE FORMWORK

- C. Clean steel forms by sandblasting or other means to remove mill scale and other ferrous deposits from the contact surface. Coat steel forms in contact with concrete form releasing agent prior to form installation.

3.03 FORM INSPECTION

- A. Notify Engineer when forms are complete and at least six working hours before the placement of concrete.

3.04 REMOVAL OF FORMS

- A. The Contractor is responsible for all damage resulting from the removal of forms and shall repair at no cost to the Owner.

END OF SECTION

SECTION 03200
CONCRETE REINFORCEMENT

PART 1. GENERAL

1.01 SUMMARY

- A. Furnish all labor, materials, equipment and incidentals required to design, install reinforcement for cast-in-place concrete as shown on the drawings and as specified herein.
- B. Dowels embedded into concrete and reinforcing of lintels for masonry units.

1.02 RELATED WORK

- A. Section 03100 Concrete Formwork
- B. Section 03300 Cast-In-Place Concrete

1.03 SUBMITTALS AND TESTING

- A. Submit in accordance with Section 01300, shop drawings and product data showing materials of construction and details of installation for:
 - 1. Reinforcing steel in accordance with ACI 315
- B. Review of the submitted materials will not relieve the Contractor of responsibility for the strength, safety, or correctness of methods used.

1.04 REFERENCE STANDARDS (Most Current Edition)

- A. American Concrete Institute (ACI)
 - 1. ACI 301 - Specifications for Structural Concrete for Buildings
 - 2. ACI 318 - Building Code Requirements for Reinforced Concrete
 - 3. ACI 315 (SP-66) - Details and Detailing of Concrete Reinforcement
- B. American Society for Testing and Materials
 - 1. ASTM A82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
 - 2. ASTM A185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
 - 3. ASTM A496 - Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
 - 4. ASTM A497 - Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement
 - 5. ASTM A615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
 - 6. ASTM A706 - Standard Specification for Low-Alloy Steel Deformed Bars for Concrete Reinforcement
- C. American Welding Society (AWS)
 - 1. AWS D1.4 Structural Welding Code - Reinforcing Steel
- D. Concrete Reinforcing Steel Institute (CRSI)
 - 1. Manual of Standard Practice

1.05 DELIVERY, HANDLING AND STORAGE

- A. Reinforcing steel shall be free of mill scale, rust, dirt, grease and other foreign matter.
- B. Ship and store reinforcing steel with bars of the same size / shape / grade and tag with a waterproof mark designation that is the same as those on the submitted shop drawings.

SECTION 03200
CONCRETE REINFORCEMENT

- C. Store reinforcing steel off of the ground and protect against dirt and moisture.

PART 2. PRODUCTS

2.01 MATERIALS

- A. Deformed Concrete Reinforcing Bars are to be Grade 60, ASTM A615
- B. Deformed Concrete Reinforcing Bars required to be field bent or welded are ASTM A706
- C. Welded Steel Wire Fabric to be ASTM A185
- D. Welded Deformed Steel Wire Fabric to be ASTM A497
- E. Reinforcing Steel Accessories
 - 1. Plastic Protected Wire Bar Supports: CRSI Bar Supports, Class 1 - Maximum Protection.
 - 2. Stainless Steel Protected Wire Bar Supports: CRSI Bar Supports, Class 2 - Moderate Protection with legs made wholly from stainless steel wire
 - 3. Precast Concrete Bar supports: CRSI Bar Supports, Precast Concrete Bar Supports. Precast concrete blocks that have equal or greater strength than the surrounding concrete.
- F. Tie Wire for reinforcing shall be 16-gauge or heavier black annealed wire

2.02 FABRICATION

- A. Comply with the CRSI Manual of Standard Practices
- B. Bend bars cold. Do not straighten or re-bend or heat bars
- C. Bend bars around a revolving collar having a diameter not less than that recommended by The CRSI manual
- D. Saw cut bar ends that are to be butt spliced, placed through limited diameter holes in metal or threaded.

PART 3. EXECUTION

3.01 INSTALLATION

- A. Comply with the CRSI Manual of Standard Practice for surface condition, bending, spacing, and tolerances of placement for reinforcement. Provide the amount of reinforcing indicated at the spacing and clearances shown on the drawings.
- B. Determine clear concrete cover based on exposure. Unless noted otherwise on the drawings, provide the following minimum concrete cover:
 - 1. Concrete cast against and permanently exposed to earth 3"
 - 2. Concrete exposed to soil, water, sewage, sludge and/or weather:
 - a. Slabs and walls (both faces) 2"
 - b. Beams and columns (ties, spirals, stirrups) 2"
 - 3. Concrete not exposed to soil, water, sewage, sludge and/or weather:
 - a. Slabs and walls (both faces) 1"
 - b. Beams and columns (ties, spirals, stirrups) 1.5"
- C. Coat placed reinforcement that will be exposed for 60 + days with a heavy coat of neat cement slurry.
- D. Do not weld reinforcing either during fabrication or erection unless indicated on the drawings or as specified herein or prior written approval by the engineer. Remove all bars that have been welded (including tack welds) without such approvals or directions. Comply with AWS D1.4 when authorized or instructed to weld reinforcement.

SECTION 03200
CONCRETE REINFORCEMENT

- E. Reinforcement bars interfering with the location of the other reinforcing steel, conduits or embedded items may be moved within the specific tolerances or one bar diameter, whichever is greater. Obtain engineers approval should a greater displacement be required to avoid the interference. Do not cut reinforcement to install inserts, conduits, sleeves, etc.
- F. Secure, support and tie reinforcing steel to prevent movement during concrete placement. Secure dowels in place before placing concrete.
- G. Closely inspect the reinforcing steel for breaks. Replace and repair by cutting out damaged bar(s) and splicing new bars.

3.02 REINFORCEMENT AROUND OPENINGS

- A. Provide additional reinforcing steel on each side of the opening equivalent to one half of the cross-sectional area of the reinforcing steel interrupted by the opening unless indicated otherwise. Extend each end of each bar beyond the edge of the opening or penetration by the tension development length for that bar size.

3.03 SPLICING OF REINFORCEMENT

- A. Compression splices - provide lap splice of 30 bar diameters, but not less than 12" unless indicated on the Drawings. Base the lap splice length for column vertical bars on the bar size in the column above.
- B. Tension lap splices shall be in accordance with ACI 318. Stagger splices in adjacent bars. Provide Class B tension lap splices at all locations unless otherwise indicated.
- C. Lap splices in welded wire fabric in accordance with the requirements of ACI 318 but not less than 12". Tie the spliced fabrics together with wire ties spaced not more than 24" on center and lace with wire of the same diameter as the welded wire fabric. Offset splices in adjacent widths to prevent continuous splices.

3.04 ACCESSORIES

- A. Provide and install accessories such as chairs, chair bars and the like to support the reinforcement at the spacings and clearances indicated on the Drawings. Secure accessories to prevent the displacement of such items during erection and concrete placement.
- B. Use precast concrete blocks where reinforcing is to be supported over soil.
- C. Provide #5 support bars (minimum). Do not reposition upper bars in a bar mat for use as support bars.

3.05 INSPECTION

- A. Notify engineer when the reinforcing is complete and ready for inspection at least 6-working hours prior to placement of concrete. Do not cover the reinforcing steel with concrete until the engineer has inspected and approved the reinforcement for size, spacing, splice lengths and positions.
- B. Forms are to be kept open for the engineer to perform the inspection.

END OF SECTION

SECTION 03300
CAST-IN-PLACE CONCRETE

PART 1. GENERAL

1.01 SUMMARY

This section describes materials and methods for cast-in-place concrete, including materials, reinforcement, formwork, and testing. These Specifications shall apply to all concrete installed by any Contractor on the project.

1.02 REFERENCES

The American Concrete Building Code Requirements for Reinforced Concrete ACI 318, ACI 350 and all standards cited in this code shall apply to all work. These include but are not limited to the following:

A. American Concrete Institute (ACI)

1. ACI 117-90 - Standard Specifications for Tolerances for Concrete Construction and Materials
2. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete
3. ACI 212.3R-04 - Chemical Admixtures for Concrete
4. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete
5. ACI 305R - Hot Weather Concreting
6. ACI 306R - Cold Weather Concreting
7. ACI 318 - Building Code Requirements for Reinforced Concrete
8. ACI 350 - Environmental Engineering Concrete Structures

B. American Society for Testing and Materials

1. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
2. ASTM C33 - Standard Specification for Concrete Aggregates
3. ASTM C39 - Standard Test Method for Compressive Strength of Cylinder Concrete Specimens
4. ASTM C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
5. ASTM C94 - Standard Specification for Ready-Mixed Concrete
6. ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete
7. ASTM C150 - Standard Specification for Portland Cement
8. ASTM C171 - Standard Specification for Sheet Materials for curing Concrete
9. ASTM C173 - Standard Test Method for Air content of Freshly Mixed Concrete by the Volumetric Method.
10. ASTM C231 - Standard Test Method for Air content of Freshly Mixed Concrete by the Pressure Method.
11. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete
12. ASTM C311 - Standard Test Method for Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland Cement Concrete.
13. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete
14. ASTM C618 - Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for use as a Mineral Admixture in Portland Cement Concrete

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15. ASTM C1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for use in Construction and Criteria for Laboratory Evaluation
16. ASTM C1260 - Standard Test Method for Potential Alkali Reactivity of Aggregates
17. ASTM E329 - Standard Practice for Use in the Evaluation of Testing and Inspection Agencies as Used in Construction

C. National Ready Mixed Concrete Association (NRMCA)

1. Quality Control Manual

D. Truck Mixer Manufacturers Bureau (TMMB)

1. TMMB 100 - Truck Mixer, Agitator and Front Discharge Concrete Carrier Standards

1.03 SUBMITTALS AND TESTING

A. Concrete Mix Submittals

1. Submit concrete mix design for each formulation of concrete proposed for use. Include sources of cement, fly ash, aggregates, air-entraining admixture, water reducing admixture, water / cement ratio and concrete slump.
2. Include in the concrete mix submittal concrete test reports to substantiate concrete suppliers standard deviation and concrete mix design. The concrete supplier shall certify that all concrete mix designs meet all requirements of ASTM C33, including all provisions regarding alkali silica reaction (ASR).

B. Reinforcement Shop Drawings

1. The Contractor shall furnish shop drawings detailing all reinforcement indicated on the contract drawings. No reinforcement shall be fabricated prior to the approval of these drawings.
2. The Contractor shall submit mix designs for all types of concrete to be used in the work, and the name and location of concrete material suppliers.

C. Qualifications of the testing laboratory shall be submitted and contain the following:

1. Name and address
2. List of technical services to be provided
3. Name and qualifications of the employees taking the samples and performing the tests

D. Material certifications for the following shall be submitted, all material certifications shall be signed by the supplier.

1. Cementitious materials
2. Admixtures
3. Steel reinforcement and accessories
4. Aggregates
5. Curing compounds

E. Field Testing

1. The contractor shall provide field testing by an independent testing laboratory as follows:

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CAST-IN-PLACE CONCRETE

- a. A laboratory test consisting of six (6) concrete cylinders shall be made of the concrete used in each major pour. The concrete contractor shall perform one such test on each day that concrete is poured and for each 50 cubic yards, or fraction thereof, as a part of the Contract. A record shall be kept showing the time and location of the batch from which the test was made. Three (3) copies of the test reports shall be transmitted to the Engineer who, in turn, will transmit one to the Owner. The cost of all concrete testing shall be borne by the Contractor.
- b. Test specimens shall consist of 6" by 12" cylinders, prepared in accordance with the latest edition of the ASTM Standard Specifications entitled "Standard Method of Making and Curing Concrete Compression and Flexure Test Specimens in the Field". All tests will be as follows:
 - 2 cyl - 7 days
 - 2 cyl - 14 days
 - 2 cyl - 28 days
- c. All specimens shall be tested by a certified testing laboratory, approved by the Engineer, in accordance with the latest edition of the ASTM Standard Specifications entitled "Standard Method of Test for Compressive Strength of Molded Concrete Cylinders: Serial Designation: C39.
- d. The testing laboratory shall conduct field tests for air entrainment and slump on all batches from which cylinders are collected in accordance with ASTM C172-0 Standard Practice for Sampling Freshly Mixed Concrete.
- e. Any concrete that fails to meet the specified requirements shall be removed and replaced with approved materials at the Contractor's expense, when and as directed by the Engineer.

E. Other Items

- 1. The Contractor shall provide copies of all concrete batch plant truck slips at the time of delivery.

1.04 DELIVERING, HANDLING AND STORAGE

- A. Cement: Store in weather tight container to protect against contamination
- B. Aggregate: Do not use frozen or partially frozen aggregate
- C. Sand: Allow sand to drain to uniform moisture content before using. Do not use partially frozen sand.
- D. Admixtures: Store in weather tight container to protect against contamination, do not allow to freeze and allow provide agitating equipment for uniform dispersion in concrete mix.

1.05 QUALITY ASSURANCE

- A. Comply with American Concrete Building Code Requirements for Reinforced Concrete ACI 318, 350R and all standards cited (most recent edition) in this code shall apply to all work.
- B. Independent testing laboratory shall meet the requirements of ASTM E329 and ASTM C1077 and be acceptable to the Engineer. There shall be no relationship / co-ownership

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between the Contractor or concrete manufacturer and the Testing Laboratory that would cause a conflict of interest.

- C. Any concrete that fails to meet the specified requirements shall be removed and replaced with approved materials at the Contractor's expense, when and as directed by the Engineer.

PART 2. PRODUCTS

2.01 MATERIALS

A. Delivery, Storage and Handling:

- 1. All materials shall be so delivered, stored and handled as to prevent the inclusion of foreign materials and damage of material by water. All materials shall be of the respective type specified herein.

B. Water

- 1. Water shall be clean and free from deleterious materials.

C. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

- 1. Portland Cement: ASTM C 150, Type II, gray, with low alkali (less than 0.6% NaOH). Supplement with the following:
 - a. Fly Ash: ASTM C 618, Class F with maximum carbon content of 3%.
 - b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

D. Aggregates

Aggregates shall conform to ASTM C-33. In addition, the amount of fine aggregate passing through a #200 sieve shall be less than 0.5%. Aggregates shall be tested and show no potential for alkali reactivity in accordance with ASTM C1260.

E. Reinforcing Bars

All reinforcement, used in this work, shall be of clean, new stock free from defects and free from bends not required by the drawings. The reinforcement shall be delivered, at the site of the work, free of mill or rust scales. The reinforcement shall be sorted for mesh and size and/or for size and length, properly identified and stored in racks suitably protected from the weather.

Reinforcing Bars shall conform to specifications for Deformed Billet Steel Bars for Concrete Reinforcement (ASTM A615). The yield strength of all bars (fy) shall be 60,000 psi, unless noted otherwise on the contract plans.

All reinforcement shall be tied in accordance with ACI recommendations for allowable movement during construction.

F. Mesh

Reinforcement shall be welded mesh fabric of the respective weights and sizes called for on the drawings, or as may be hereinafter specified. Wire mesh shall conform in all respects to the ASTM Standard Specifications for "Cold Drawn Steel Wire for Concrete Reinforcement" - Serial Designation A185-37.

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G. Admixtures

All admixtures shall be subject to approval by the Engineer.

Air Entraining admixtures shall conform to the specifications of ASTM C260.

Water Reducing admixtures shall conform to ASTM C494, Type A or Type F.

Proportion and mix is accordance with manufacturer's recommendations.

H. Flexible PVC Waterstops:

CE CRD-C 572, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes. Profile shall be ribbed without center bulb and dimensions shall be 6 inches by 3/8" thickness

I. Self-Expanding Waterstops:

Manufactured rectangular or trapezoidal strip, with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch.

J. Liquid Water-Repellant:

All exterior concrete shall have a water repellant applied. The repellant shall be a non-toxi, breathable, clear water repellent intended for single-coat application that, after cure, leaves no visible surface residue, color or gloss. Silicone or acrylic based materials will not be accepted. Repellant shall be Hydrozo Clear 600 as manufactured by Hydrozo Coatings Co., Barrier B-28 percent as manufactured by Barrier Chemical Corp. or approved equal.

K. Waterproofing:

Xypex Concentrate Admix C-2000 / C-1000 concrete waterproofing. This admixture shall be used in all concrete tank walls and slabs that contain liquids.

2.02 CONCRETE

All concreting, both labor and materials, shall conform to the following:

- A. Develop concrete mixes and their testing by an independent testing laboratory engaged by and at the expense of the Contractor
- B. The ingredients shall be proportioned to meet the design strength and materials limits specified in Table 1 and to produce workable, durable concrete conforming to these specifications
- C. Base concrete mixes on standard deviation data of prior mixes with essentially the same proportions of the same materials or develop concrete mixes by laboratory tests using the materials proposed for the work. For concrete mixes developed by laboratory testing, base cement content of the concrete on curves showing the relationship between water : cement ratio and 7 and 28-day compressive strengths of concrete made using the proposed materials. Determine curves by four or more points, each representing an average value of at least three test specimens and one water : cement ratio at each age. Provide curves with a range of values sufficient to yield the desired data, including the compressive strengths specified, without extrapolation. The cement content of the concrete mixes to be used, as determined

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from the curve, shall correspond to the required average compressive strength in Table 5.3.2.2 of ACI 318. The resulting mix shall not conflict with the limiting values for maximum water : cement ratio and net minimum cement content specified in Table A of this section.

- D. Test the fly ash and/or the fly ash and concrete mixture to provide test data confirming that the fly ash in combination with the cement to be used meets all strength requirements and is compatible with the other concrete additives.
- E. Test aggregates for potential alkali reactivity in accordance with ASTM C1260.
- F. Entrained Air shall be measured by ASTM C231 and be in accordance with Table A
- G. Slump shall be measured by ASTM C143 and be in accordance with Table A
- H. Proportion admixtures according to the manufacturer's recommendations. Two or more admixtures specified may be used in the same mix provided that the admixtures in combination retain full efficiency and have no deleterious effect on the concrete or on the properties of the other admixture(s). The aggregates shall be proportioned so as to produce a conglomerate aggregate of the minimum void content, plus the necessary excess of fines as may be required to give the desired workability. The mixed concrete shall contain a sufficient quantity of cement paste to slightly overfill the void.

All mixes should conform to the following Table A:

Mix A - For concrete fill applications

Mix B - For Non-liquid holding structures; walks, building foundations / slabs

Mix C - For Liquid containing structures with walls / slabs 16" thick or greater

Mix D - For Liquid containing structures with walls / slabs 16" thick or less

TABLE A					
Mix	28-Day Design Strength (PSI)	Cement ASTM*	Fine Aggregate*	Coarse Aggregate*	Cement Content (Lbs/CY)
A	2500	C150 Type II	C33	C33	440
B	4000	C150 Type II	C33	C33	520
C	4500	C150 Type II	C33	C33	560
D	4500	C150 Type II	C33	C33	590
Mix	Water/Cement Ratio	Fly Ash**	Entrained Air (%)	Water Reducer	Slump Range
A	0.50	Yes	4.5 to 7.5	Yes	3.0" - 5.0"
B	0.44	Yes	4.5 to 7.5	Yes	3.0" - 5.0"
C	0.42	Yes	4.5 to 7.5	Yes	3.0" - 5.0"
D	0.42	Yes	4.5 to 7.5	Yes	3.0" - 5.0"

All sidewalks shall include 1.5 lb. fiberglass fibers per cubic yard, Fibermesh, Grace or equal.

Flyash content shall be between 15% and 25% if the total cementitious material used in the batch.

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The Engineer must approve all mixes to be used prior to construction. No mix or concrete may be used without approval by the Engineer.

The batch plant and the Contractor shall conform to all batch times and time limits specified by NYSDOT. Loads exceeding those times will be rejected.

PART 3. EXECUTION

3.01 WORKMANSHIP

Workmanship shall be of the highest quality and only competent and experienced workmen, skilled in their trade, shall be employed on this work.

3.02 MEASURING MATERIALS

- A. Provide concrete composed of Portland cement, fly ash, fine aggregate, coarse aggregate, water and admixtures as specified and produced by a plant complying with ACI 318 and ASTM C94. Batch all constituents, including admixtures, at the plant.
- B. Measure materials for batching concrete by weighing in conformity with and within the tolerances stated in ASTM C94. Scales must be certified by Sealer of Weights and Measures within one year of use. Weigh cement and fly ash in individual weigh batches that are separate and distinct from those used for other materials.
- C. Measure the amount of free water in fine aggregates within 0.3% with a moisture meter. Adjust for moisture content of fine aggregates. Record the number of gallons of water as-batched on printed batch tickets.

3.03 MIXING AND TRANSPORTING

- A. Comply with ACI 304R, ACI 318 and ASTM C94 for all central plant and transport methods.
- B. Provide ready-mixed concrete produced by equipment complying with ACI 318 and ASTM C94 and produced by a plant certified by the NRMCA. All truck mixers shall carry a rating plate conforming to TMMB 100. Clean each mix truck drum and reverse drum rotation before truck proceeds under the batching plant. Each transit-mix truck must have a continuous, nonreversible, revolution counter showing the number of revolutions at mixing speeds.
- C. The entire contents of the drum shall be discharged before recharging. The mixer shall be cleaned whenever mixing is suspended and at frequent intervals when in use.
- D. The volume of the mixed material per batch shall not exceed the manufacturer's rated capacity of the mixer.
- E. No concrete shall be placed in the work after its initial set has occurred and re-tempered concrete shall not be used under any conditions.

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- F. Contractor is to provide equipment of size and type to provide continuous flow of concrete at the delivery end.
- G. Weigh-tickets shall be prepared and delivered, in duplicate, with each truck showing the actual batch size; quantity delivered; the actual weights of cement, fine and coarse aggregate, fly ash and water; moisture content of fine and coarse aggregate at time of batching; type, brand and quantity of each admixture; time of loading at the ready-mix plant; the time and quantity of any additional water. A blank shall also be provided on the weigh-ticket for the time of arrival at the site; this space is to be filled in and initialed by the Contractor's superintendent or foreman. A copy of the weigh-ticket shall be delivered to the Engineer for each batch of concrete delivered to the site.
- H. The Engineer or representative, shall have access to the batch plant, from which the ready-mixed concrete is supplied, for the purpose of inspecting materials used in the mix and for checking and reporting the time of departure of each truck from the mixing plant to the job site.
- I. The mix truck, used in transporting the concrete shall have its drum rotating from the time it is charged until it is discharged.
- J. Temperature and Mixing Time Control
 - 1. In cold weather, if water or aggregate has been heated, combine water with aggregate in the mixer before cement is added. Do not add cement to mixtures of water and aggregate when the mixture temperature is greater than 90° F.
 - 2. In hot weather, cool ingredients before mixing to maintain temperature of the concrete below 90° F.
 - 3. Maximum time interval from the addition of mixing water and/or cement to the batch and the final placement in the forms shall not exceed:

Temperature of Air or Concrete	Maximum Time
80° F to 90° F.	45 minutes
70° F to 79° F	60 minutes
40° F to 69° F	90 minutes

3.04 PLACING

- A. Before placing concrete, the forms shall be thoroughly cleaned of all chips, shavings and other debris. Provisions shall be made for transporting the concrete rapidly from the place of mixing to the work with as little jostling as possible so that the tendency of the water to rise to the top may be reduced to a minimum.
- B. The concrete shall be placed before it has had time to attain the initial set and under no conditions shall it be re-tempered and used. Any concrete which may have become compacted shall be satisfactorily re-mixed just before placed in the forms.
- C. Concrete shall not be deposited in freestanding water, loose dirt, rubbish or other foreign matter, nor shall water be permitted to rise on or flow over freshly placed concrete until the concrete has set for at least twenty four (24) hours.

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- D. Concrete shall be deposited as near its final position as is possible to prevent segregation. thoroughly worked around reinforcement, imbedded accessories and into the corners of the forms.
- E. Concreting shall proceed at such a rate that the previously placed concrete is integrated with fresh plastic cement. Concrete shall at all times be plastic and flow readily into the space between the bars.
- F. Slabs: Place each batch into the edge of the previously placed concrete to avoid stone pockets, segregation and cold joints.
- G. In placing concrete, care shall be taken to avoid disturbing the steel reinforcing extending into the concrete that has partially set.
- H. All concrete shall be adequately protected from mechanical injury or by actions of the elements until such time as the concrete is thoroughly set.
- I. Place concrete in forms using tremie tubes taking care to prevent segregation. Keep end of tremie tubes in contact with the concrete already in place. Do not drop concrete freely more than 4 feet. Place concrete for walls in 12" to 24" lifts keeping the walls surface horizontal.

3.05 COMPACTING

- A. Consolidate concrete by vibration and puddling, spading, rodding or forking so that concrete is completely worked around reinforcement, embedded items, openings and into corners. Continuously perform puddling, spading, rodding and forking along with vibration of the placement of concrete to eliminate air or stone pockets.
- B. Compact all concrete with mechanical vibrators. Keep standby vibrators on site during placing of concrete
- C. Use vibrators having a minimum frequency of 7000 revolutions per minute. Insert vibrators and withdraw at points from 18" to 30" apart. Vibrate sufficiently at each insertion to consolidate concrete, generally 5 to 15 seconds. Do not over vibrate so as to segregate.
- D. All laborers are to be trained in the correct use of mechanical vibrators in concrete consolidation.

3.06 CURING

- A. As soon as the exposed horizontal concrete surfaces have been finished and are sufficiently hardened (not easily scratched), they shall be cured to retain moisture and maintain a temperature of at least 50° F for a minimum of 7 days after placement. Curing shall be done by one of the two methods outlined below:
 - 1. Water Curing (Liquid Containing Structures, structural slabs, slabs receiving grout): All exposed concrete surfaces shall be kept constantly moist by continuously sprinkling with clean water that is within 20° F of the concrete temperature or by covering with burlap which shall be continuously kept moist. Water curing will not be allowed during freezing weather.

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2. Sheet Material Curing (slabs not requiring water curing as listed above):
All finished exposed concrete surfaces cured through the use of sheet material shall conforming to the ASTM C171. The sheet material shall be lapped 6 inches along all edges and remain covering the concrete for at least seven (7) days. All joints shall be taped and any tears resulting from subsequent operations on the slab within the seven days shall be taped or the sheet replaced.

3.07 TEMPERATURE OF CONCRETE

- A. Concrete, when deposited, shall have a temperature ranging between a minimum of fifty (50) degrees F. and a maximum of ninety (90) degrees F.
- B. No concrete shall be deposited during freezing temperatures without explicit permission of the Engineer.
- C. Cold Weather shall be defined as a 3-successive days having an average outdoor temperature of 40° F or lower.
 1. Concrete placement, curing, protection, delivery, and batch formula (admixtures, heating) shall comply with ACI 306R
 2. Contractor shall provide a cold weather concreting plan outlining methods and procedures for batch formula changes, transportation, placement, protection, curing, concrete temperature monitoring, standby equipment, etc.
 3. The minimum temperature of concrete immediately after placement and during the protection period shall be:

< 12" thick section = 55° F	(Max Temp. 75° F)
12" to 36" = 50° F	(Max Temp. 70° F)
 4. Protect concrete during cold weather by providing continuous warm, moist curing for a total of 350 degree-days of curing. Degree-days are defined as the daily average temperature of the air at the concrete surface over a 24-hour period. Temperature is to be taken in the shade.
 5. Protect the concrete surface from direct exposure to temperatures 40° F and below.
- D. Hot Weather concreting is defined in ACI 305R as a rate of evaporation exceeding 0.2 pounds per square foot per hour as a result of high temperatures, low humidity and wind velocity. The Contractor shall request the Engineer to make a determination of Hot Weather protection measures in accordance with ACI 305R should the climate dictate.
 1. Temperature of the concrete being placed shall not exceed 90° F.
 2. Contractor shall provide a hot weather concreting plan outlining methods and procedures for batch formula changes, transportation, placement, protection, curing, concrete temperature monitoring, standby equipment, etc.

3.08 FIELD TESTS

- A. Slump Tests shall be made by the Testing Lab personnel immediately prior to placing the concrete. Such tests shall be made in accordance with ASTM C143. If the slump is greater than the specified range, the concrete will be rejected.
- B. Air Content: Test for air content shall be made by the Testing Lab personnel on a fresh concrete sample. Such tests shall be made in accordance with ASTM C231 or ASTM C173 if the volumetric method is used due to high absorption aggregates.

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- C. Water Content: Test for water content shall be made by the Engineer or Testing Lab personnel on a fresh concrete sample. Such tests shall be made in accordance with AASHTO T318.

3.09 DEFECTIVE WORK

- A. All concrete work, not formed as shown on the drawings, out of alignment or level, or showing a defective surface, shall be removed and completely replaced in a manner meeting with the Engineer's approval. Slight imperfections, which may be patched without impairing the strength or appearance of the structure, may be patched, providing the Engineer's permission is obtained prior to the patching.
- B. Permission to patch work shall not be considered as a waiver of the Owner's right to require complete removal of such defective work if the patching done fails to satisfactorily restore the quality and appearance of the work. In short, all defective concrete work shall be made good by patching or replacement, regardless of any previous permission that the Contractor may have received regarding procedure or methods of concrete operations.
- C. Defective areas, which are to be replaced when so directed by the Engineer, shall be chipped away to a depth not less than two (2) inches clear inside of the reinforcement and the edges of the cut shall be perpendicular to the finished surface. The surfaces of the cut and a space at least six (6) inches wide, entirely surrounding the cut, shall be wetted thoroughly to prevent absorption of water from the patching mortar. The patch shall be made of the same materials and of the same proportions as were used for the original concrete except that the coarse aggregate shall be omitted and fine aggregate substituted therefore. In order for the patch to match the surrounding concrete, it may be necessary to substitute white cement for a part of the gray cement. The amount of water used in mixing shall be as little as is consistent with the requirements of handling and placing. The mortar shall be thoroughly compacted into place and shall be finished slightly higher than the surrounding surface. It shall then be left undisturbed from two (2) to three (3) hours to permit the initial shrinkage before being finished. The patch shall be finished to match the adjoining surface and shall be protected and cured as provided herein before.

3.10 POINTING AND PATCHING

- A. Immediately after the removal of forms, the concrete surfaces shall be inspected for defective areas and the Contractor shall immediately replace and/or patch all imperfections in accordance with these specifications. No pointing or patching shall be done prior to the inspection of such imperfections by the Engineer and then shall be done only after his approval has been given.
- B. All grout shall be composed of one (1) part Portland Cement and two (2) parts sand.

3.11 CLEANUP

- A. Any and all work, of this and/or other trades, soiled or damaged in the execution of the work covered by this section of the specifications, shall be thoroughly cleaned, repaired and/or replaced, as directed by the Engineer, at this Contractor's expense.

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- B. Upon completion of his work this Contractor shall remove all his tools, equipment, surplus material, debris, etc., leaving the premises in an orderly and clean condition.

3.12 COORDINATION

- A. The General Contractor shall coordinate with other contractors as to providing sleeves, anchors, and pads, and other requirements that are necessary to complete construction. The General Contractor shall be responsible for placement of such items for the other contractors.

END OF SECTION

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CONCRETE REHABILITATION AND MODIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Removal of deteriorated concrete and reinforcement and subsequent replacement and patching.
 - 2. Hydraulic Retaining Structure Rehabilitation.
 - 3. Epoxy crack injection.
 - 4. Urethane crack injection.
 - 5. Corrosion-inhibiting treatment.
 - 6. Polymer overlays.
- B. Related Sections include the following:
 - 1. Division 03 Section "Cast-In-Place Concrete".
 - 2. Division 07 Section "Water Repellent Coating".

1.3 UNIT PRICES

- A. Unit prices include the cost of preparing existing construction to receive the work indicated and costs of field quality-control testing required by the Work for which the unit price applies.
- B. Concrete Removal and Replacement or Patching: Work that is paid for by the unit price method shall be by the cubic foot computed on the basis of rectangular solid shapes approximating the actual shape of concrete removed and replaced with average depths, widths, and lengths, measured to the nearest inch.
 - 1. Reinforcing bar replacement will be paid for separately by the pound of replacement steel with mechanical splices and drilling and epoxy anchoring paid for by the unit.
- C. Epoxy and Urethane Crack Injection: Work will be paid for by the linear foot of crack injected measured on one side of the element being repaired. Separate unit prices will be provided for crack repairs that only need capping adhesive.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include material descriptions, chemical composition, physical properties, test data, and mixing, preparation, and application instructions.

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- B. Load Tables: For epoxy adhesive provide load table(s) giving hole diameter and depth required to pull-out anchorage for grade 60 reinforcing steel equal to the tensile capacity of the bar.
 - 1. Test Reports: ICC-ES listings and performance data that includes recommended loading for each application of epoxy adhesive and anchors.
 - 2. Only manufacturers with an ICC-ES listing will be considered. Contractor shall submit, for Engineer's review, calculations that are prepared and sealed by a registered Professional Engineer showing product can achieve an equivalent holding capacity using the appropriate design procedure as required by the Building Code. The calculations shall indicate diameter and embedment depth – with consideration of all applicable load adjustment factors – for product to achieve equivalent performance to that illustrated on the drawings.
- C. Qualification Data: For installers and manufacturers.
 - 1. Submit letters of acceptance by product manufacturers certifying that installers are approved to apply their products.
- D. Material Certificates: For each type of product indicated, signed by manufacturers.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for bonding agents, patching mortars and epoxy adhesives.
- F. Rehabilitation Program and Field Quality Control: For each phase of rehabilitation process, including protection of surrounding materials and Project site during operations. Describe in detail materials, methods, equipment, sequence of operations and Field Quality Control to be used for each phase of the Work.
- G. Warranty: Submit sample and Final Warranty.
- H. Field Reports and Certification: Manufacturers Representative shall submit weekly Field Reports documenting conditions encountered, and any remediation work necessary to comply with the Warranty.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Installer that specializes in concrete restoration and employs workers trained and approved by manufacturer to apply corrosion-inhibiting treatments and concrete patching and rebuilding materials, epoxy and urethane crack injection materials and polymer overlays.
- B. Manufacturer Qualifications: Manufacturer that employs factory-trained representatives who are available for consultation and Project-site inspection. Representative shall not be involved in sales.
- C. Source Limitations: Obtain concrete patching and rebuilding materials, epoxy and urethane crack injection and water repellent coating materials through one source from a single manufacturer.

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1.6 WARRANTY

- A. Warranty: Contractor and Product manufacturer shall provide material and labor warranty for all work specified in this section.
 - 1. The warranty covers any failures of the systems used in rehabilitation of concrete structures at the wastewater treatment plant exclusive of occurrences that are covered by insurance or abnormal activities.
 - 2. Warrantee period shall last for 5 years from date of substantial completion of the project.
 - 3. Should warrantee repairs be required, they will be scheduled around the owners operations. The owner will provide continual access to area(s) needing repair. Repairs will be made as expediently as possible including around the clock operations if deemed necessary by the Owner.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in manufacturer's original and unopened containers, labeled with type and name of products and manufacturers.
- B. Comply with manufacturer's written instructions for minimum and maximum temperature requirements and other conditions for storage.
- C. Store cementitious materials off the ground, under cover, and in a dry location.
- D. Store aggregates, covered and in a dry location, where grading and other required characteristics can be maintained and contamination avoided.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations for Epoxies: Do not apply when air and substrate temperatures are outside limits permitted by manufacturer. During hot weather, cool epoxy components before mixing, store mixed products in shade, and cool unused mixed products to retard setting. Do not apply to wet substrates unless approved by manufacturer.
 - 1. Use only Class A epoxies when substrate temperatures are below or are expected to go below 40 deg F within 8 hours.
 - 2. Use only Class A or B epoxies when substrate temperatures are below or are expected to go below 60 deg F within 8 hours.
 - 3. Use only Class C epoxies when substrate temperatures are above and are expected to stay above 60 deg F for 8 hours.
- B. Cold-Weather Requirements for Cementitious Materials: Do not apply unless air temperature is above 40 deg F and will remain so for at least 48 hours after completion of Work.
- C. Cold-Weather Requirements for Cementitious Materials: Comply with the following procedures:

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1. When air temperature is below 40 deg F, heat patching material ingredients and existing concrete to produce temperatures between 40 and 90 deg F.
 2. When mean daily air temperature is between 25 and 40 deg F, cover completed Work with weather-resistant insulating blankets for 48 hours after repair or provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 48 hours after repair.
 3. When mean daily air temperature is below 25 deg F, provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 48 hours after repair.
- D. Hot-Weather Requirements for Cementitious Materials: Protect repair work when temperature and humidity conditions produce excessive evaporation of water from patching materials. Provide artificial shade and wind breaks, and use cooled materials as required. Do not apply to substrates with temperatures of 90 deg F and above.

PART 2 - PRODUCTS

2.1 BONDING AGENTS

- A. Epoxy-Modified, Cementitious Anticorrosion Bonding Agent: Product that consists of water-insensitive epoxy adhesive, portland cement, and water-based solution of corrosion-inhibiting chemicals that forms a protective film on steel reinforcement.
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Euclid Chemical Company (The); Corr-Bond.
 - b. Kaufman Products, Inc; Surepoxy HM EPL.
 - c. Sika Corporation; Armatec 110 EpoCem.
 - d. Sonneborn, Div. of ChemRex; Sonoprep.
 - e. Sto Corp., Concrete Restoration Division; Sto Bonding and Anti-Corrosion Agent.
 - f. Tamms Industries, Inc.; Duralprep A.C.

2.2 PATCHING MORTAR

- A. Patching Mortar, General:
1. Unless otherwise indicated, use any of the products specified in this Article.
 2. Coarse Aggregate for Adding to Patching Mortar: Washed aggregate complying with ASTM C 33, Size No. 8, Class 5S. Add only as permitted by patching mortar manufacturer.
- B. Polymer-Modified, Silica-Fume-Enhanced, Integral-Corrosion-Inhibitor, Cementitious Patching Mortar: Packaged, dry mix complying with ASTM C 928, that contains silica fume complying with ASTM C 1240 and a non-redispersible latex additive as either a dry powder or a separate liquid that is added during mixing. Product shall also contain integral corrosive inhibitor.

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1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Euclid Chemical Company (The); Verticoat Supreme.
 - b. Fox Industries, Inc.; FX-261 Polymer Repair Mortar or FX-286.
 - c. MBT Protection and Repair, Div. of ChemRex; Emaco S88 CI.
 - d. Meadows, W. R., Inc.; Sealtight Meadow-Crete H2 or Sealtight Meadow-Crete-GPS.
 - e. Sika Corporation; Sika Monotop 615.
 - f. Sonneborn, Div. of ChemRex; Gel Patch Sonopatch 200 or Sonopatch 300.

2.3 CONCRETE

- A. Concrete Materials and Admixtures: Comply with Division 03 Section "Cast-in-Place Concrete."
- B. Reinforce Steel and Reinforcement Accessories: Comply with Division 03 Section "Cast-in-Place Concrete."
- C. Form-Facing Materials: Comply with Division 03 Section "Cast-in-Place Concrete."

2.4 MISCELLANEOUS MATERIALS

- A. Epoxy Crack Injection Adhesive: ASTM C 881/C 881M, Type I, IV, Grade 1, except for gel time, solvent free.
 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ChemCo Systems; CCS Grout, Standard, Standard - High Ambient Temperature or Low Viscosity.
 - b. Dayton Superior Corporation; Resi-Bond (J-58), Sure-Anchor Epoxy (J-50) or Sure-Inject (J-56).
 - c. Euclid Chemical Company (The); Euco #352 Epoxy System, Euco #452 Epoxy System, Euco #620 Epoxy System, Euco #452 LV, Euco #620 LV or Eucopoxy Injection Resin.
 - d. Kaufman Products, Inc.; Surepoxy HMLV, Surepoxy HMLV-Class B, or Surepoxy HM-SLV.
 - e. MBT Protection and Repair, Div. of ChemRex; Concrecive Standard LVI or SCB Concrecive 1380.
 - f. Meadows, W. R., Inc.; Sealtight Rezi-Weld LV.
 - g. Sika Corporation; Sikadur 35, Hi-Mod LV, Sikadur 35, Hi-Mod LV LPL, Sikadur 52 or Sikadur Injection Gel.
 - h. Sonneborn, Div. of ChemRex; Epofil or Epofil SLV.
 - i. Tamms Industries, Inc.; Duralcrete LV.
- B. Urethane Injection Resin: Urethane Injection resin shall be low viscosity hydrophilic resin with the following physical properties:
 1. Elongation \geq 250% ASTM D 3574

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2. Shrinkage \leq 11% ASTM D 1042
 3. Viscosity – Uncured 700 to 1100 cps @ 77°F
 4. Tensile Strength > 150 psi ASTM D 3574
- C. Capping Adhesive: Product manufactured for use with crack injection adhesive by same manufacturer.
- D. Postinstalled Anchors: Chemical anchors, made from stainless-steel components complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 for bolts and nuts; ASTM A 666 or ASTM A 276, Type 304 or 316, for anchors, with capability to sustain, without failure, a load equal to four times the load imposed, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
- E. Epoxy Adhesive (Grout): Adhesives shall be a cartridge type, two-component, solid epoxy based system dispensed and mixed through a static mixing nozzle supplied by the manufacturer. The adhesive shall meet the minimum requirements of ASTM C-881 Type I, II, IV and V, Grade 3, Class B and C. Acceptable installation and performance temperature ranges shall be verified with manufacturer's literature prior to installation. Epoxy adhesives shall have an evaluation report issued by ICC-ES and be tested in accordance with ICC-ES's Acceptance Criteria for Adhesive Anchors in Concrete Elements (AC 58) for the following::
1. Seismic and wind loading.
 2. Long term creep at elevated temperatures.
 3. Static loading at elevated temperatures.
 4. Damp and water-filled holes.
 5. Freeze-thaw conditions.
 6. Critical and minimum edge distance and spacing.

2.5 MIXES

- A. Mix products, in clean containers, according to manufacturer's written instructions.
1. Add clean silica sand and coarse aggregates to products only as recommended by manufacturer.
 2. Do not add water, thinners, or additives unless recommended by manufacturer.
 3. When practical, use manufacturer's premeasured packages to ensure that materials are mixed in proper proportions. When premeasured packages are not used, measure ingredients using graduated measuring containers; do not estimate quantities or use shovel or trowel as unit of measure.
 4. Do not mix more materials than can be used within recommended open time. Discard materials that have begun to set.
- B. Concrete: Comply with Division 03 Section "Cast-in-Place Concrete."

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PART 3 - EXECUTION

3.1 GENERAL

- A. Polymer-Modified, Silica-Fume-Enhanced, Integral-Corrosive-Inhibited, Cementitious Patching Mortar shall be used for overlaying walkways and patches up to 2-1/2" thick.
- B. For concrete repairs greater than 2-1/2" thick, the concrete will be replaced with cast-in-place concrete conforming to specification section 03300. Epoxy-modified, cementitious and anti-corrosion bonding agent shall be utilized with cast-in-place concrete or for encapsulation of reinforcing that will remain exposed due to demolition and to prepare the surface of exposed concrete prior to placing new concrete.
- C. Urethane Injection materials are required for cracks that retain fluid. Epoxy injection materials are required for cracks that do not retain fluid.
- D. Exterior walkway surfaces and concrete walls of hydraulic retaining structures (1'-0" below the normal water surface as determined by the hydraulic profile) shall be sealed per specification section 07191.

3.2 EXAMINATION

- A. Notify Engineer seven days in advance of dates when areas of deteriorated or delaminated concrete and deteriorated reinforcing bars will be located.
- B. Locate areas of deteriorated or delaminated concrete using hammer or chain drag sounding and mark boundaries. Mark areas for removal by simplifying and squaring off boundaries as directed by Engineer. At columns and walls make boundaries level and plumb, unless otherwise indicated.
- C. Locate at least three reinforcing bars using a pachometer, and drill test holes to determine depth of cover. Calibrate pachometer, using depth of cover measurements, and verify depth of cover in removal areas using pachometer.

3.3 PREPARATION

- A. Protect people, motor vehicles, equipment, surrounding construction, Project site, plants, and surrounding buildings from injury resulting from concrete rehabilitation work.
 - 1. Protect adjacent equipment and surfaces by covering them with heavy polyethylene film and waterproof masking tape. If practical, remove items, store, and reinstall after potentially damaging operations are complete.
 - 2. Neutralize and collect alkaline and acid wastes according to requirements of authorities having jurisdiction, and dispose of by legal means off Owner's property.

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3. Dispose of runoff from wet operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.
 4. Collect runoff from wet operations and dispose of by legal means off Owner's property.
- B. Shoring: Install temporary supports before beginning concrete removal.
- C. Concrete Removal:
1. Saw-cut perimeter of areas indicated for removal to a depth of at least 1/4 inch. Make cuts perpendicular to concrete surfaces and no deeper than cover on reinforcement.
 2. Remove deteriorated and delaminated concrete by breaking up and dislodging from reinforcement.
 3. Remove additional concrete, if necessary, to provide a depth of removal of at least 1/4 inch over entire removal area.
 4. Where half or more of the perimeter of reinforcing bar is exposed, bond between reinforcing bar and surrounding concrete is broken, or reinforcing bar is corroded, remove concrete from entire perimeter of bar and to provide at least a 3/4-inch clearance around bar.
 5. Test areas where concrete has been removed by tapping with hammer, and remove additional concrete until unsound and disbonded concrete is completely removed.
 6. Provide fractured aggregate surfaces with a profile of at least 1/8 inch that are approximately perpendicular or parallel to original concrete surfaces. At columns and walls, make top and bottom surfaces level, unless otherwise directed.
 7. Thoroughly clean removal areas of loose concrete, dust, and debris.
- D. Reinforcing Bar Preparation:
1. Remove loose and flaking rust from reinforcing bars by high-pressure water cleaning or abrasive blast cleaning, needle scaling or wire brushing until only tightly bonded light rust remains.
 2. Where section loss of reinforcing bar is more than 25 percent, or 20 percent in 2 or more adjacent bars, cut bars and remove and replace as directed by Engineer. Remove additional concrete as necessary to provide at least 3/4-inch clearance at existing and replacement bars. Splice replacement bars to existing bars according to ACI 318, by lapping, welding, or using mechanical couplings.
 3. Anchor new dowels into existing concrete by drilling a hole in the existing concrete and anchoring reinforcing steel with epoxy adhesive. Size of hole shall be determined by adhesive supplier to provide pull-out capacity equal to the tensile capacity of the reinforcing. Install in accordance with manufacturer's instructions.
- E. Surface Preparation for Overlays: Remove delaminated material and deteriorated concrete surface material. Roughen surface of concrete by sand blasting, shot blasting, scarifying, needle scaling, high-pressure water jetting, scabbling, flame blasting, or milling to produce a surface profile matching CSP 5 through 7 per ICRI 03732 depending on product utilized and manufacturers' recommendation. Sweep and vacuum roughened surface to remove debris followed by low-pressure water cleaning.

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3.4 APPLICATION

- A. General: Comply with manufacturer's written instructions and recommendations for application of products, including surface preparation.
- B. Epoxy-Modified, Cementitious Bonding and Anticorrosion Agent: Apply to reinforcing bars and concrete by stiff brush or hopper spray according to manufacturer's written instructions. Apply to reinforcing bars in two coats, allowing first coat to dry two to three hours before applying second coat. Allow to dry before placing concrete.
- C. Patching Mortar: Unless otherwise recommended by manufacturer, apply as follows:
 - 1. Wet substrate thoroughly and then remove standing water.
 - 2. Place patching mortar by troweling toward edges of patch to force intimate contact with edge surfaces. For large patches, fill edges first and then work toward center, always troweling toward edges of patch. At fully exposed reinforcing bars, force patching mortar to fill space behind bars by compacting with trowel from sides of bars.
 - 3. For vertical patching, place material in lifts of not more than 2 inches nor less than 1/4 inch. Do not feather edge.
 - 4. After each lift is placed, consolidate material and screed surface.
 - 5. Where multiple lifts are used, score surface of lifts to provide a rough surface for application of subsequent lifts. Allow each lift to reach final set before placing subsequent lifts.
 - 6. Allow surfaces of lifts that are to remain exposed to become firm and then finish to a smooth surface with a wood or sponge float.
 - 7. Wet-cure cementitious patching materials, including polymer-modified, cementitious patching materials, for not less than seven days by water-fog spray or water-saturated absorptive cover.
- D. Concrete: Place according to Division 03 Section "Cast-in-Place Concrete" and as follows:
 - 1. Apply epoxy-modified, cementitious bonding and anticorrosion agent to reinforcement and concrete substrate.
 - 2. Use vibrators to consolidate concrete as it is placed.
 - 3. At unformed surfaces, screed concrete to produce a surface that when finished with patching mortar will match required profile and surrounding concrete.
 - 4. Wet-cure concrete for not less than seven days by leaving forms in place or keeping surfaces continuously wet by water-fog spray or water-saturated absorptive cover.
 - 5. Fill placement cavities with dry-pack mortar and repair voids with patching mortar. Finish to match surrounding concrete.
- E. Epoxy and Urethane Crack Injection: Comply with manufacturer's written instructions and the following:
 - 1. Subject to site engineers approval, use urethane to inject cracks in hydraulic retaining walls or slabs and epoxy injection in cracks that are not required to retain fluid.
 - 2. Clean areas to receive capping adhesive of oil, dirt, and other substances that would interfere with bond, and clean cracks with oil-free compressed air or low-pressure water to remove loose particles.

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3. Place injection ports as recommended by material manufacturer, spacing no farther apart than thickness of member being injected. Seal injection ports in place with capping adhesive.
4. Seal cracks at exposed surfaces with a ribbon of capping adhesive at least 1/4 inch thick by 1 inch wider than crack.
5. Inject cracks wider than 0.003 inch to a depth of 8 inches or to a width of less than 0.003 inch, whichever is less.
6. Inject epoxy or urethane adhesive, beginning at widest part of crack and working toward narrower parts. Inject adhesive into ports to refusal, capping adjacent ports when they extrude epoxy. Cap injected ports and inject through adjacent ports until crack is filled.
7. After epoxy or urethane adhesive has set, remove injection ports and grind surfaces smooth.

3.5 FIELD QUALITY CONTROL

- A. Quality Control: The intent of this specification section is to provide a thorough rehabilitation of the existing concrete structures that will last longer than the 5 year warrantee period specified here-in-before. The product manufacturer shall provide a field quality control program to assure the correct materials are being applied in a manner that is in accordance with the manufacturers recommendations and last beyond the warrantee period. Unless a more stringent program is required by the manufacturer, provide the following services:
1. On site training of all applicators.
 2. Weekly site visits including issuance of written inspection reports.
 3. Site visits shall be provided for the first 3 days of surface preparation and application of each product employed.
 4. Performance of any testing necessary to assure proper materials are being used and adequate surface preparation or environmental conditions are being maintained.

END OF SECTION

SECTION 04200
UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes unit masonry assemblies consisting of the following:
 - 1. Concrete masonry units (SFCMU)
 - 2. Mortar and grout.
 - 3. Reinforcing steel.
 - 4. Masonry joint reinforcement.
 - 5. Ties and anchors.
 - 6. Embedded and concealed copper-laminated flashing.
 - 7. Metal drip plates.
 - 8. Miscellaneous masonry accessories.
 - 9. Masonry-Cell Insulation.
 - 10. Cavity-Wall Insulation.

1.3 DEFINITIONS

- A. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Submit a certificate from The New York State Concrete Masonry Association that the concrete masonry unit producer is a current participant in F'm2000 The NYSCMA Assurance of Quality Program.
- C. Shop Drawings: For the following:
 - 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
 - 2. Reinforcing Steel:
 - a. Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."
 - b. Show elevations of reinforcement in wall at 1/4" = 1'-0" scale.
 - c. Show laps or mechanical splices on elevations.
 - 3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- D. Samples for Initial Selection: For the following:
 - 1. All concrete masonry units, in the form of small-scale units.

SECTION 04200
UNIT MASONRY

2. Weep holes / vents.
 3. Flashings, 12" x 12" sample to show type, gauge and profile.
- E. Qualification Data for Installer:
1. For Installer. Submit data for firms and persons specified to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, telephone numbers, names of Engineers and Owners, and other information specified.
 - a. Identify all experience by firms and persons with glazed concrete masonry units as well as any experience with ceramic tile work.
- F. Material Certificates: Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards. Provide for each type and size of the following:
1. Masonry units.
 - a. Include material test reports substantiating compliance with requirements.
 - b. All cubes of CMU delivered to this project will be marked with the New York State Concrete Masonry Association's "F'm2000 The NYSCMA Assurance of Quality" label.
 2. Cementitious materials. Include brand, type, and name of manufacturer.
 3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 4. Grout mixes. Include description of type and proportions of ingredients.
 5. Reinforcing bars.
 6. Joint reinforcement.
 7. Anchors, ties, and metal accessories.
- G. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports, per ASTM C 780, for mortar mixes required to comply with property specification.
 2. Include test reports, per ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
- H. 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
- I. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.
- J. Material Test Reports: Submit to the Special Inspector and Engineer reports from a qualified independent Testing Agency employed and paid by Contractor indicating and interpreting test results relative to compliance of the following proposed masonry materials with requirements indicated:
1. Mortar complying with property requirements of ASTM C 270.
 2. Grout complying with ASTM C476; include description of type and proportions of grout ingredients.

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- 3. Masonry units.
- K. Submit proposed grouting program for grouting concrete masonry walls. Grouting shall be in accordance with recommendations of NCMA-Tek 3-2, "Grouting Concrete Masonry Walls".
- L. Submit certification of full compliance with all provisions of the ARRA Buy American requirements.

1.5 QUALITY ASSURANCE

- A. Material Testing Agency Qualifications: An independent agency qualified according to ASTM C 1093 for testing indicated, as documented according to ASTM E 548.
- 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, through one source from a single manufacturer for each product required. Concrete masonry units shall be manufactured by a producer certified by The New York State Concrete Masonry Association's "F'm2000 The NYSCMA Assurance of Quality Program" or an accepted equivalent program.
- C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate.
- D. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by other means, as acceptable to authorities having jurisdiction.
- E. Unit Masonry Standard: Comply with ACI 530.1/ASCE 6 "Specifications for Masonry Structures".

1.6 DELIVERY, STORAGE, AND HANDLING

- A. 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.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery

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containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.

- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 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.
 - 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
 - 2. Where 1 wythe of multi-wythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.
- C. 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.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather requirements. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602, BIA Technical Note #1, NCMA-TEK #3-1C and as noted on Drawings.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1.8 MATERIAL EVALUATION / QUALITY CONTROL

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- A. Preconstruction Testing: Contractor shall employ and pay a qualified independent Testing Agency to perform the following preconstruction testing indicated, as well as other inspecting and testing services required for source and field quality control:
 - 1. Concrete Masonry Unit Tests: For each different concrete masonry unit indicated, units shall be tested for strength, absorption, and moisture content in accordance with ASTM C 140 and C90.
 - 2. Prism Tests: For each type exterior load bearing wall construction indicated, masonry prisms shall be tested in accordance with ASTM E 447, Method B.
 - 3. Mortar properties shall be tested in accordance with ASTM C 270, if Property Specification is used.
 - 4. Mortar composition and properties shall be evaluated in accordance with ASTM C 780, if Proportion Specification is used.
 - 5. Grout compressive strength shall be tested in accordance with ASTM C 1019.

PART 2 - PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
- B. Manufacturer and Product Option: Information indicating size and dimensional requirements of masonry units indicated as "Basis-of-Design" are based on the product indicated. Other products of manufacturers with equal performance characteristics may be considered.
 - 1. Do not modify intended aesthetic effects including color and texture, as judged solely by the Engineer. Exceptional approval by Engineer for color and texture is possible, but not probable. Exceptional approval for color and texture may also not diminish indicated performance requirements. Where modifications are proposed to achieve match of color and texture, submit comprehensive explanatory data to Engineer for review.

2.2 MASONRY UNITS, GENERAL

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in the completed Work or will impair the quality of completed masonry.
- B. Comply with referenced unit masonry standard and other requirements specified in this Section applicable to each material indicated.

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2.3 ARCHITECTURAL CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows:
 - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 - 2. Provide square edged units for outside corners for exterior walls, unless otherwise indicated.
 - 3. Provide multi-faced units for all corners, unless otherwise indicated.
 - 4. Size: Provide concrete masonry units complying with requirements indicated below for size that are manufactured to specified face dimensions within tolerances specified in applicable referenced ASTM specification for concrete masonry units. Typical nominal exposed face is approximately 4-inch height by 16-inch length unless field verified otherwise. If not shown on Drawings, use length to produce coursing with little or no cutting.
 - 5. Exposed Faces: Provide units with smooth face unless otherwise noted.
 - 6. Integral Water Repellent: Provide units made with integral water repellent for mold and moisture resistance.
 - 7. Color: Manufacturer's integral mixed color pigment. The intent of that the exterior masonry match as closely as possible the existing brick faces.
- B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work includes, but is not limited to, the following:
 - 1. Zappala Block Company: 4" height x 8" depth x 16" length
 - 2. Approved Equal

2.4 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce required mortar color.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of Portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207, Type S.
- D. Ready-Mixed Mortar: Cementitious materials, water, and aggregate complying with requirements specified in this article, combined with set-controlling admixtures to produce a ready-mixed mortar complying with ASTM C 1142.
- E. Additives: Not permitted.
- F. Aggregate for Mortar: ASTM C 144.
 - 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.

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2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
- G. Aggregate for Grout: ASTM C 404.
- H. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with concrete masonry units, containing integral water repellent by same manufacturer.
 1. Available Products:
 - a. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Dry-Block Mortar Admixture.
 - b. Engineer approved equal as coordinated with water-repellent admixture in approved concrete masonry units.
- I. Water: Potable.

2.5 REINFORCING STEEL

- A. Steel Reinforcing Bars: Billet steel complying with ASTM A 615 - Grade 60.
- B. Masonry Joint Reinforcement, General: ASTM A 951.
 1. Interior and Exterior Walls: Hot-dip galvanized, carbon steel.
 2. Wire Size for Side Rods: W1.7 or 0.148-inch diameter.
 3. Wire Size for Cross Rods: W1.7 or 0.148-inch diameter.
 4. Wire Size for Veneer Ties: W1.7 or 0.148-inch diameter.
 5. Spacing of Cross Rods and Cross Ties: Not more than 16 inches o.c.
 6. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.
- C. Masonry Joint Reinforcement for Single-Wythe Masonry: Ladder type with single pair of side rods.
- D. Masonry Joint Reinforcement for Multi-wythe Masonry:
 1. Standard Adjustable Tie: Adjustable (two-piece) type, ladder design, with one side rod at each face shell of backing wythe and with separate ties that extend into facing wythe. Ties have two hooks that engage eyes or slots in reinforcement and resist movement perpendicular to wall. Ties extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face. Ties shall be spaced 16" on center vertically and horizontally.
- E. Masonry Joint Reinforcement for CMU veneer: Provide single-wythe joint reinforcing in veneer wythe.

2.6 TIES AND ANCHORS, GENERAL

- A. General: Provide ties and anchors specified in subsequent articles that comply with requirements for metal and size of referenced unit masonry standard and of this article.
- B. Galvanized Carbon Steel Wire: ASTM A 82, coating class as required by referenced unit masonry standard for application indicated.

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- C. Stainless Steel Wire: ASTM A 580, Type 304, for wire ties and anchors in exterior walls.
- D. Wire Diameter: 0.1875 inch.
- E. Galvanized Steel Sheet: ASTM A 366 (commercial quality) cold-rolled carbon steel sheet, hot-dip galvanized after fabrication to comply with ASTM A 525, Class B2 (for unit lengths over 15 inches), and Class B3 (for unit lengths under 15 inches), for sheet metal ties and anchors.
- F. Galvanized Heavy-Thickness Steel Sheet: ASTM A 635 (commercial quality) hot-rolled carbon steel sheet hot-dip galvanized after fabrication to comply with ASTM A 525, Class B3, for rigid anchors fabricated from steel sheet or strip with a thickness of 0.180 inch and greater.
- G. Steel Plates and Bars: ASTM A 36, hot-dip galvanized to comply with ASTM A 123 or ASTM A 153, Class B3, as applicable to size and form indicated.

2.7 BENT WIRE TIES

- A. Individual units prefabricated from bent wire to comply with requirements indicated below:
 - 1. Tie Shape: Rectangular with closed ends and not less than 4 inches wide.
 - 2. Hohmann & Barnard, Inc.
 - 3. Dur-O-Wal, Inc.
 - 4. Heckmann Building Products, Inc.

2.8 MISCELLANEOUS ANCHORS

- A. Unit Type Masonry Inserts in Concrete: Cast-iron or malleable-iron inserts of type and size indicated.
- B. Dovetail Slots: Furnish dovetail slots with filler strips of slot size indicated, fabricated from 0.0336-inch (22-gauge) sheet metal.
- C. Standard Anchor Bolts: Headed bolts or threaded rods complying with A 307, Grade A, with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153, Class C, of diameter and length indicated.
- D. Anchor Bolts in Contact with Pressure Treated Lumber: Stainless-steel components complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 for bolts and nuts; ASTM A 666 or ASTM A 276, Type 304 or 316, for anchors.
- E. Bearing Plates: Comply with ASTM A 36.

2.9 POST-INSTALLED ANCHORS

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- A. Anchors as described below, with capability to sustain, without failure, load imposed within factors of safety indicated, as determined by testing in accordance with ASTM E 488, conducted by a qualified independent testing laboratory.
1. Type: Chemical anchors.
 2. Corrosion Protection: Carbon steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5 (5 microns) for Class SC 1 service condition (mild).
 3. For cast-in-place and post-installed anchors in concrete: Capability to sustain, without failure, a load equal to four times loads imposed by masonry.
 4. For post-installed anchors in grouted concrete masonry units: Capability to sustain, without failure, a load equal to six times loads imposed by masonry.

2.10 EMBEDDED FLASHING MATERIALS

- A. Exposed Metal Drip Plate Flashing with Concealed Flexible Laminated-Copper Flashing:
1. Provide metal flashing, where flashing is exposed or partly exposed and where indicated, complying with SMACNA's "Architectural Sheet Metal Manual" and Division 7 Section "Manufactured Roof and Wall Specialties" and as follows:
 - a. Stainless Steel: ASTM A 240/A 240M, Type 304, 0.016 inch thick.
 - b. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
 - c. Fabricate concealed through-wall metal flashing embedded in masonry from flexible copper-laminated flashing plus stainless steel drip plate for exposed drip.
 - 1) Products (Basis-of-Design): Hohmann & Barnard, Inc.;
 - a) Concealed Laminated-Copper Flashing, H & B C-Fab Flashing
 - b) Exposed Stainless Steel Drip Plate, H & B DP system.
 - c) Approved Equal Products as approved by Engineer.
 2. Fabricate metal flashing with snaplock receiver on exterior face where indicated to receive counterflashing. Refer to Division 7 Section "Manufactured Roof and Wall Specialties" for this metal counterflashing and coordinate its masonry use with indicated laminated-copper through-flashing.
 3. Fabricate metal drip plate from stainless steel with drip edge unless otherwise indicated. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed unless noted otherwise for reglet and counterflashing application at wall. Refer to Division 7 Section "Manufactured Roof and Wall Specialties" for reglet and counterflashing application at wall.
- B. Concealed Flexible Flashing: For flashing not exposed to the exterior, use one of the following, unless otherwise indicated:
1. Copper-Laminated Flashing: 5-oz./sq. ft. copper sheet bonded with asphalt between 2 layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
 - a. Products:
 - 1) Hohmann & Barnard, Inc.; H & B C-Fab Flashing. (Basis-of-Design)
 - 2) Or Approved Equal Product as approved by Engineer.

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- C. Solder and Sealants for Sheet Metal Flashings: As specified in Division 7 Section "Manufactured Roof and Wall Specialties".
 - 1. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
 - 2. Solder for Copper: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.
 - 3. Elastomeric Sealant: ASTM C 920, chemically curing urethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- D. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.11 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- D. Weep / Vent Products: Use the following, unless otherwise indicated:
 - 1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color selected from manufacturer's standard.
 - a. Available Products:
 - 1) Advanced Building Products Inc.; Mortar Maze weep vent.
 - 2) Dayton Superior Corporation, Dur-O-Wal Division; Cell Vents.
 - 3) Heckmann Building Products Inc.; No. 85 Cell Vent.
 - 4) Hohmann & Barnard, Inc.; Quadro-Vent.
 - 5) Wire-Bond; Cell Vent.
- E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
 - 1. Provide one of the following configurations:
 - a. Strips, full-depth of cavity and 10 inches wide, with dovetail shaped notches 7 inches deep that prevent mesh from being clogged with mortar droppings.
 - 2. Available Products:
 - a. Basis-of-Design Product:
 - b. Mortar Net USA, Ltd.; Mortar Net.
 - c. Or Engineer Approved Equal to Basis-of-Design product.

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- F. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication. Provide units with either two loops or four loops as needed for number of bars indicated.
1. Available Products:
 - a. Dayton Superior Corporation, Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817.
 - b. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
 - c. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
 - d. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.
- G. Reinforcing Bar Mechanical Slices: Mechanically joining deformed reinforcing bars with steel sleeves applied over the ends of rebars. Provide rebar splicing system that meets the yield strength requirements of the specific application.
1. Available Products:
 - a. Barsplice Products, Inc., Rebar Coupler Systems.
 - b. Dywidag Systems International (DSI), Threadbar Reinforcing Systems.
 - c. ERICO, Inc., Lenton Rebar Splice.

2.12 MASONRY-CELL INSULATION

- A. Foamed In-Place masonry insulation:
1. Available Products:
 - a. Core-Fill 500, Tailored Chemical Products
 - b. Approved Equal

2.13 CAVITY WALL INSULATION

- A. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV, closed-cell product extruded with an integral skin.
- B. Adhesive: Type recommended by insulation board manufacturer for application indicated.

2.14 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned. Do not use acid based cleaners on SFCMU.

2.15 MORTAR AND GROUT MIXES

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- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.
 - 2. Limit cementitious materials in mortar to portland cement, mortar cement, and lime.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270 and BIA Technical Notes 8A, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
 - 1. Limit cementitious materials in mortar to portland cement-lime.
 - 2. For masonry below grade and in contact with earth, and for exterior, above-grade load-bearing and nonload-bearing walls and parapet walls, for interior load-bearing walls, and for areas where another type is not indicated, use Type S.
 - a. For interior nonload-bearing partitions, use Type N.
 - b. For veneers, use Type N.
 - 3. Provide entrained air content of 10 to 12 percent.
- D. Grout for Unit Masonry: Comply with ASTM C 476.
 - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
 - 2. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.
- E. Mortar for Glazed Concrete Masonry Units: Use epoxy additive for a water-repellant mortar that is color matched to the existing mortar.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
 - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
 - 2. Verify that foundations are within tolerances specified.
 - 3. Verify that reinforcing dowels are properly placed.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

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- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
- 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. 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. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
1. Mix units from several pallets or cubes as they are placed.
- F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.
- G. Comply with construction tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:
1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet , 1/4 inch in 20 feet , or 1/2 inch maximum.
 2. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
 3. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet , 1/4 inch in 20 feet , or 1/2 inch maximum.
 4. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch . Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
 5. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
 6. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.
 7. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

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3.3 LAYING MASONRY WALLS

- 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. Bond Pattern for Exposed Masonry: Unless otherwise indicated, bond pattern shall match existing. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2 inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- D. 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, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Fill space between steel frames and masonry solidly with mortar, unless otherwise indicated.
- G. 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.
- H. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.
- I. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above, unless otherwise indicated.
 - 1. Install compressible filler in joint between top of non load bearing partition and underside of structure above.
 - 2. Brace top of interior partition walls as indicated on drawings.
- J. Outside corner at interior walls: Coordinate CMU bull nose corners at ceramic tile locations. The CMU backup behind the ceramic tile shall have square corners and transition to bull nose above the ceramic tile wainscot height. The square corner shall be ground down such that it slopes back to the bull nose at the next course above the ceramic tile wainscot height.

3.4 MORTAR BEDDING AND JOINTING

- A. Lay hollow concrete masonry units as follows:

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1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
 2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
 3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
 4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
 5. Veneers shall be laid with full bed and head joints; butter ends with sufficient mortar to fill head joint.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

3.5 CAVITY WALLS

- A. Bond wythes of cavity walls together using one of the following methods:
1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 1.77 sq. ft. of wall area spaced not to exceed 16 inches o.c. horizontally and 16 inches o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space so that veneer anchors are not more than 8 inches on center. At intersecting and abutting walls, provide ties at no more than 24 inches o.c. vertically.
 - a. Where bed joints of wythes do not align, use adjustable (two-piece) type ties.
 2. Masonry Joint Reinforcement: Installed in horizontal mortar joints.
 - a. Use adjustable (two-piece) type reinforcement with continuous horizontal wire in facing wythe attached to ties.
 3. Masonry Veneer Anchors: Comply with requirements for anchoring masonry veneers.
- B. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.
- C. Coat cavity face of backup wythe to comply with Division 7 Section "Bituminous Dampproofing."

3.6 MASONRY JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
1. Space reinforcement not more than 16 inches o.c.

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2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.
 - a. Reinforcement above is in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.
- E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.7 MOVEMENT (CONTROL AND EXPANSION) JOINTS

- A. General: 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 as follows:
 1. Install preformed control-joint gaskets designed to fit standard sash block.
 2. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.
 3. Provide vertical control joints at a maximum of 30'-0" on center at all wall locations and at structural and non-structural movement joints. At all locations use control joint details shown on the drawings. Field coordinate all joints with the engineer.
 4. Unless noted otherwise on Drawings, reinforcing in bond beams (not joint reinforcing) is to continue through control joints; rake the vertical joint on each side, and provide backer rod and sealant in joint.

3.8 LINTELS

- A. Install lintels where indicated.
- B. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated.

3.9 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- B. Install flashing as follows, unless otherwise indicated:
 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall

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flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

2. At multi-wythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches, and 1-1/2 inches into the inner wythe. Form 1/4-inch hook in edge of flashing embedded in inner wythe.
 3. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
 4. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Division 7 Section "Joint Sealants" for application indicated.
 5. Install metal drip edges and sealant stops with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Division 7 Section "Joint Sealants" for application indicated.
 6. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal drip edge.
 7. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal flashing termination.
 8. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.
- C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.
- D. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:
1. Use specified weep/vent products to form weep holes.
 2. Space weep holes 24 inches o.c., unless otherwise indicated.
- E. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in Part 2 "Miscellaneous Masonry Accessories" Article.

3.10 INSTALLATION OF REINFORCED UNIT MASONRY

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

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- B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602 and reinforcing steel shop drawings.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
 - 1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 - 2. Limit height of vertical grout pours to not more than 60 inches.
- D. Unless noted otherwise, provide continuous bond beams reinforced with two #5 bars at floors, roof, and at the top of parapets. Provide corner bars the same size as continuous reinforcing in all wall corners, changes of elevation of bond beams and intersections, lapped 2 feet with continuous reinforcing.
- E. Provide minimum vertical reinforcing of one #4 bar in all window and single leaf man door jambs, ends of walls, corners, and each side of vertical control joints; locate bar a maximum of 6" from end of CMU. Locate vertical reinforcing at a maximum 4'-0" on center at all locations at interior and exterior walls unless noted otherwise. If typical vertical wall reinforcing noted is larger than #4, use the larger size.

3.11 FIELD QUALITY CONTROL

- A. Inspectors: Owner will engage qualified independent inspectors to perform inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform inspections.
 - 1. Place grout only after inspectors have verified compliance of grout spaces and grades, sizes, and locations of reinforcement.

3.12 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. CONTRACTOR shall not the proposed block stains easily. Special provisions and care should be taken while placing block to contain mortar and grout and keep away from new block.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

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1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Engineer's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
6. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.
7. Clean SFCMU as per manufacturer's instructions and do not use acid containing cleaners.
8. Do not allow mortar lumps or smears to harden on GCMU, clean continuously during installation with clean damp cloth. Wipe down with masonry cleaner as per manufacturer's instructions.

END OF SECTION

SECTION 05500
METAL FABRICATIONS

PART 1 GENERAL

1.01 REFERENCES

- A. Standards: Comply with the following unless otherwise specified or indicated:
 - 1. Welding: "Structural Welding Code - Steel, AWS D 1.1:2000", by The American Welding Society (AWS Code).
 - 2. Design and Fabrication: "Construction Manual Series, Section 1, Specifications for Aluminum Structures, December, 1986", by the Aluminum Association, Incorporated (AAI Specification).
 - 3. Welding: "Structural Welding Code – Aluminum, AWS D1.2", by the American Welding Society (AWS Code).

1.02 SUBMITTALS

- A. Shop Drawings: Show fabrication details and connections to adjacent work. Furnish setting drawings and templates for installation of bolts and anchors in other work.
- B. Product Data: Manufacturer's catalog cuts, printed specifications, and installation instructions.

1.03 QUALITY ASSURANCE

- A. Galvanizing: Stamp galvanized items with galvanizer's name, weight of coating and applicable ASTM number.
- B. Alloy Identification: Mill mark aluminum material with allow and heat treatment designation.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Fabricate miscellaneous metal assemblies and components from the following applicable materials required to produce units conforming to the design and types of metal fabrications indicated.
 - 1. Steel Plates, Shapes and Bars: ASTM A 36.
 - 2. Hot-Rolled Carbon Steel Bars: ASTM A 575, Grade as selected by fabricator.
 - 3. Gray Iron Castings: ASTM A 48, Class 30.
 - 4. Steel Pipe: ASTM A 53; Type as selected; Grade A; black finish, except galvanized for exterior locations and elsewhere where indicated; standard weight (Schedule 40), unless otherwise indicated.
 - 5. Aluminum Castings: ASTM B 26 or ASTM B 108, Alloy 514.0, Temper as required.
 - 6. Aluminum Plate and Sheet: ASTM B 209, Alloy 3003, Temper H-16.
 - 7. Extruded Aluminum Shapes and Tubes: ASTM B 221 or ASTM B 308, Alloy 6061, temper as required.
 - 8. Rolled Bars and Rods: ASTM B 211.

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9. Rolled or Extruded Structural Shapes: ASTM B 308.
 10. Extruded Structural Pipe and Tube: ASTM B 429.
 11. Aluminum Grating: I-Bar, GIA Series or Aluminum Plank – HD Series Grating by McNichols or equivalent. Grating to be suitable to support the design loading indicated on drawings and 100 psf without exceeding 1/4" deflection.
 12. Hot Dipped Galvanized Steel Grating: Rectangular bar grating with bearing bars 1 3/16" on center. Material to be carbon steel with hot dipped galvanized finish (after fabrication). Grating to be suitable to support the design loading indicated on drawings and 100 psf without exceeding 1/4" deflection.
 13. Stainless Steel Grating: Rectangular bar grating with bearing bars 1 3/16" on center. Material to be stainless steel type 304. Grating to be suitable to support the design loading indicated on drawings and 100 psf without exceeding 1/4" deflection.
 14. Stairway Treads: Stairway treads to be fabricated from rectangular bar grating with abrasive nosing in material to match stairway construction.
 15. Abrasive Nosing: Provide aluminum corrugated nosing for aluminum fabrications and cast iron abrasive nosing for carbon steel fabrications.
- B. Fasteners and Anchors: Furnish type, size, and grade required for fabrication and installation of the Work of this Section. Fasteners and anchors shall be cadmium plated steel for ferrous metals and stainless steel for non-ferrous metals unless otherwise indicated:
1. Standard Bolts: FS FF-B-575C, Type as required.
 2. Machine Screws: FS FF-S-92B, Type and Style as required.
 3. Machine Bolts:
 - a. ASME/ANSI B18.5, ASME/ANSI B18.9, or ASME/ANSI B18.18.1.
 - b. Type II, Class and Form as required.
 4. Nuts: FS FF-N-836E, Type and Style as required.
 5. Lag Bolts:
 - a. ASME/ANSI B18.2.1 or ASME/ANSI B18.18.1.
 - b. Type as required, Style 1, Grade B.
 6. Plain Washers: FS FF-W-92B, round, general assembly grade, carbon steel.
 7. Lock Washers: FS FF-W-84A, helical spring type carbon steel.
 8. Expansion Anchors:
 - a. FS A-A-1922, FS A-A-1923, FS A-A-1924, FS A-A-1925, FS A-A-55614, or FS A-A-55615.
 - b. Type and Style as required.
 9. Stainless Steel Fasteners: Type 316.
- C. Regalvanizing Paint: Single component giving 93 percent pure zinc in the dried film, and meeting the requirements of MIL-P-21035B (NAVY).
- D. Shop Paint: FS TT-P-615D, Type II.
 1. Shop Paint for Galvanized Steel: FS TT-P-641G, Type II.
- E. Bituminous Paint: Asphaltic Type, SSPC-Paint 12.

2.02 FABRICATION - GENERAL

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METAL FABRICATIONS

- A. Fabricate metal items of material, size, and thicknesses indicated. If not indicated, use material of required size and thickness to produce adequate strength and durability for the intended use of the finished product.
- B. Fabricate items intended to be exposed to view of material entirely free of surface blemish, including pitting, roller and seam marks, rolled trade names, or roughness. Remove surface blemishes by grinding or by welding and grinding, prior to cleaning, treating, and finishing.
- C. Form work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32" unless otherwise shown. Form bent-metal corners to the smallest radius possible without causing grain separation or otherwise impairing the material.
- D. Weld corners and seams continuously. Grind exposed welds smooth and flush, to match and blend with adjoining surfaces.
- E. Form exposed connections with flush, smooth hairline joints. Use concealed fasteners wherever possible. Provide Phillips flathead (countersunk) screws or bolts for exposed fasteners unless otherwise indicated or specified.
- F. Prepare fabricated metal items for anchorage of the type indicated, coordinated with the supporting structure. Fabricate and space anchoring devices as indicated or as required to provide adequate support for the intended use of the Work.
- G. Cut, reinforce, drill, and tap fabricated metal items as required to receive finish hardware and other appurtenant items.
- H. Fabricate grating with banded edges and fastener attachments below the walking surface. Coordinate openings with other trades.
- I. Galvanizing: Unless otherwise specified or noted, items indicated to be galvanized shall receive a zinc coating by the hot-dip process, after fabrication, complying with the following:
 - 1. ASTM A 123 for plain and fabricated material.
 - 2. ASTM A 153 for iron and steel hardware.
- J. Cleaning Aluminum: Thoroughly clean structural aluminum. Remove oil, grease, and similar contaminants in accordance with SSPC SP-1 "Solvent Cleaning".
 - 1. Etch aluminum surfaces if so recommended by the manufacturer of the shop paint (general).
- K. Shop Painting:
 - 1. Galvanized Items:
 - a. Galvanized items which are to be finish painted under Section 09900 shall be rinsed in hot alkali or in an acid solution and then in clear water.
 - b. Welded and abraded galvanized surfaces shall be wire brushed and repaired with a coating of cold galvanizing compound.

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- c. Do not paint galvanized items which are not to be finish painted under Section 09900.
 - 2. Aluminum Items: Apply one coat of shop paint (general) to aluminum surfaces except as follows:
 - a. Do not shop paint aluminum surfaces to be field welded.
 - b. Apply 2 coats of shop paint, before assembly, to aluminum surfaces inaccessible after assembly, except surfaces in contact.
 - 3. Apply coatings on dry surfaces in accordance with the manufacturer's printed instructions, and to the following minimum thickness per coat:
 - a. Shop Paint (General): 5.0 mils wet film.
 - b. Shop Paint for Galvanized Steel: 3.0 mils wet film.
 - c. Cold Galvanizing Compound: 2.0 mils dry film.
 - L. Anodized Finish: Comply with the Standards For Anodized Architectural Aluminum by the Aluminum Association. Do not anodize aluminum surfaces within 3 inches of any surface to be field welded.
 - 1. Clear Anodized Finish: AA-M32A41, minimum 0.7 mil coating.
- 2.03 FLOOR GRATING
- Not Used
- 2.04 SAFETY NOSINGS
- Not Used
- 2.05 TRENCH COVERS
- A. Acceptable Manufacturers:
 - 1. Neenah Foundry Company's R-4990 Series, heavy duty, Type L bolted trench frame with a Type A grated cover.
 - 2. Flockhart Foundry Company's Roadway Type 679 bolted trench frame with grating.
 - 3. Barry Pattern & Foundry Company's B-H20G Series, heavy duty, Type L bolted trench frame with Type A grates.
 - B. Frames: Heavy duty rated, gray cast iron castings with continuous rabbet to receive grating cover, and with integrally cast tie-anchor lugs and anchors spaced not more than 24 inches oc. Furnish frame end piece at each end of trench, and tie bolts for tie-anchor lugs.
 - 1. Auxiliary Flat Bar Anchors: Steel bar anchors 3/16 inch thick x 1 inch wide x approximately 4 inches long, with 1-1/2 inch long bent end, and hole for tie bolt in other end. Furnish flat bar anchor at each pair of tie-anchor lugs and at the single tie-anchor lugs at trench ends, except at joints in concrete slab.
 - C. Grated Covers: Heavy duty rated, gray cast iron castings fabricated into 2 feet long sections.
 - D. Removable Dams: Steel plate, fabricated as shown, and galvanized.

SECTION 05500
METAL FABRICATIONS

PART 3 EXECUTION

3.01 PREPARATION

- A. Isolation: Isolate non-ferrous metal surfaces in contact with dissimilar metals, concrete, or masonry by coating non-ferrous surface with bituminous paint.

3.02 INSTALLATION

- A. Fit and set fabricated metal items accurately, in designed locations, at proper elevation and alignment. Measure locations from approved established lines and levels.
- B. Fit exposed connections accurately to form tight hairline joints. Weld connections that are not intended to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind joints smooth. Cut off exposed threaded portions of bolts flush with nuts.
- C. Field Welding: Comply with AWS Code for the procedures for manual shielded arc welding, appearance and quality of welds and for the methods used in correcting welding work.
- D. Attached Work: Drill holes for fasteners with power tools to exact size required. Unless otherwise shown on the Drawings, fasten fabricated metal items to concrete and solid masonry with expansion anchors. Fasten fabricated metal items to hollow masonry and stud partitions with toggle bolts.
- E. Grating Attachments: Attach grating to support structure with recessed fasteners compatible with material utilized.

END OF SECTION

SECTION 06610
FIBERGLASS REINFORCED PLASTICS (FRP) FABRICATIONS

PART 1 GENERAL

1.01 SCOPE

- A. The CONTRACTOR shall design, furnish, fabricate (where necessary), and install all fiberglass reinforced plastic (FRP) items, with all appurtenances, accessories and appurtenances necessary to produce a complete, operable and serviceable installation of FRP grating, and miscellaneous FRP piping as shown on the Contract Drawings and as specified herein, and in accordance with the requirements of the Contract Documents.

1.02 REFERENCES

- A. The FRP systems shall, as applicable, meet the requirements of the following industry standards:

ASTM Test Methods:

ASTM D 635 Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position

ASTM E 84 Surface Burning Characteristics of Building Materials

1.03 SUBMITTALS

- A. The CONTRACTOR shall furnish shop drawings of all fabricated gratings, covers, baffles and pipes, including all accessories in accordance with the provisions of this Section.
- B. The CONTRACTOR shall furnish manufacturer's shop drawings clearly showing material sizes, types, styles, part or catalog numbers, complete details for the fabrication and erection of components including, but not limited to, location, lengths, type and sizes of fasteners, clip angles, member sizes, and connection details.
- C. The CONTRACTOR shall submit the manufacturer's published literature including structural design data, structural properties data, plate load/deflection tables, concrete anchor systems and their allowable load tables, and design calculations for systems not sized or designed in the contract documents.
- D. The CONTRACTOR may be requested to submit sample pieces of each item specified herein for acceptance by the ENGINEER as to quality and color. Sample pieces shall be manufactured by the method to be used in the WORK.

1.04 QUALITY ASSURANCE

- A. All items to be provided under this Section shall be furnished only by manufacturers having a minimum of ten (10) years experience in the design and manufacture of similar

SECTION 06610
FIBERGLASS REINFORCED PLASTICS (FRP) FABRICATIONS

products and systems. Additionally, if requested, a record of at least five (5) previous, separate, similar successful installations in the last five (5) years shall be provided.

- B. Manufacturer shall offer a 3 year limited warranty on all FRP products against defects in materials and workmanship.

1.05 PRODUCT DELIVERY AND STORAGE

- A. Delivery of Materials: Manufactured materials shall be delivered in original, unbroken pallets, packages, containers, or bundles bearing the label of the manufacturer. Adhesives, resins and their catalysts and hardeners shall be crated or boxed separately and noted as such to facilitate their movement to a dry indoor storage facility.
- B. Storage of Products: All materials shall be carefully handled to prevent them from abrasion, cracking, chipping, twisting, other deformations, and other types of damage. Adhesives, resins and their catalysts are to be stored in dry indoor storage facilities between 70 and 85 degrees Fahrenheit (21 to 29 degrees Celsius) until they are required.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. The physical layout of the system as shown on the contract drawings and the equipment specified herein are based upon a system by Corrosion Specialty Services of Albany, NY. The use of this system does not remove any responsibility of the CONTRACTOR to verify dimensions and elevations to ensure the equipment will fit within the proposed building and equipment configurations. The use of an "or equal" system will require the manufacturer to provide a modified layout subject to the approval of the ENGINEER. The FRP systems supplied shall be in compliance with these specifications and plans and shall be supplied by one of the following manufacturers:
 - 1. Corrosion Specialty Services
 - 2. Approved equal

2.02 GENERAL

- A. All FRP items furnished under this Section shall be composed of fiberglass reinforcement and resin in qualities, quantities, properties, arrangements and dimensions as necessary to meet the design requirements and dimensions as specified in the Contract Documents.
- B. Fiberglass reinforcement shall be bi-directional rovings in sufficient quantities as needed by the application and/or physical properties required.
- C. Resin shall be Polyester, with chemical formulations as necessary to provide the corrosion resistance, strength and other physical properties as required.
- D. All finished surfaces of FRP items and fabrications shall be smooth, resin-rich, free of

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FIBERGLASS REINFORCED PLASTICS (FRP) FABRICATIONS

voids and without dry spots, cracks, crazes or unreinforced areas. All glass fibers shall be well covered with resin to protect against their exposure due to wear or weathering.

2.03 MOLDED FRP COVERS AND GRATING (WITH INTEGRAL IBEAM SUPPORTS AS REQUIRED)

- A. Manufacture: Covers shall be of a one piece molded construction manufactured by building up multiple layers of resin-impregnated fiberglass reinforcements which are continuous and equally oriented in the length and width directions. The plate shall have a nominal thickness of 1/4". Percentage of glass (by weight) shall not exceed 35% so as to achieve maximum corrosion resistance, and as required to maintain the required structural capabilities. Where necessary, integral I-beam will be glassed to the bottom side of the plate and orientated to provide required support per spans and load ratings. After molding, no dry glass fibers shall be visible on any surface. All surfaces shall be smooth and uniform with no evidence of fiber orientation irregularities, interlaminar voids, porosity, resin rich or resin starved areas.
- B. Non-slip surfacing with colored gel coat top coat shall be installed on all exposed surfaces with tie down clips.
- C. Color shall be as requested by Owner
- D. Load/Deflection: Cover load/deflection requirements at the required span shall be less than manufacturers published maximum recommended loads.
 - 1. All FRP covers and grating shall be designed with a uniform distributed load over required span of 100 pounds per square foot, with a maximum deflection of 1/180.
- E. All covers shall be equipped with gaskets as to supply an air tight cover.
- F. All covers and grating shall be of a size that two people can reasonable handle covers to gain access to the covered tanks without the use of any equipment. Each panel shall be equipped with handles allowing for ease of handling.
- G. The FRP fabricator shall be responsible for supplying all connections to existing and proposed concrete.

2.03 MISCELLANEOUS MOLDED FRP PIPE AND ODOR CONTROL INTAKES

- A. FRP piping shall be a minimum thickness of 1/4"
- B. FRP piping shall be designed and fabricated for odor control service to carry warm, moisture-laden air with hydrogen sulfide and other organic and inorganic compounds associated with wastewater treatment.
- C. FRP piping shall be of laminated FRP construction. All piping shall be constructed from resin impregnated filaments and shall be UV resistant.

SECTION 06610
FIBERGLASS REINFORCED PLASTICS (FRP) FABRICATIONS

PART 3 EXECUTION

3.01 INSPECTION

- A. The Owner reserved the right to conduct any shop inspection. The fabricator shall give ample notice to Contractor prior to the beginning of any fabrication work so that inspection may be provided. The plate shall be as free, as commercially possible, from visual defects such as foreign inclusions, delamination, blisters, resin burns, air bubbles and pits. The surface shall have a smooth finish (except for grit top surfaces).

3.02 INSTALLATION

- A. Contractor shall install covers in accordance with manufacturer's assembly drawings. Lock plate panels securely in place with hold-down fasteners as specified herein. Field cut and drill fiberglass reinforced plastic products with carbide or diamond tipped bits and blades. Seal cut or drilled surfaces in accordance with manufacturer's instructions. Follow manufacturer's instructions when cutting or drilling fiberglass products or using resin products; provide adequate ventilation.

END OF SECTION

SECTION 07200
ROOF DECK AND INSULATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including the Conditions of the Contract and Division 01 Specification Sections apply to this section.

1.2 SUMMARY

- A. Section includes roof insulation over the properly prepared deck substrate.
- B. Related Sections:
 - 1. Section 07500 – Sheet Metal Flashing and Trim.

1.3 REFERENCES

- A. American Society for Testing and materials (ASTM):
 - 1. ASTM A167 Standard Specification for Stainless and Heat-Resisting Chromium Nickel Steel Plate, Sheet and Strip.
 - 2. ASTM A653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process.
 - 3. ASTM B29 Standard Specification for Refined Lead.
 - 4. ASTM B32 Standard Specification for Solder Metal.
 - 5. ASTM C165 Standard Test Method for Measuring Compressive Properties of Thermal Insulation.
 - 6. ASTM C208 Standard Specification for Cellulosic Fiber Insulation Board.
 - 7. ASTM C209 Standard Test Method for Cellulosic Fiber Insulating Board.
 - 8. ASTM C272 Standard Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions.
 - 9. ASTM C1396 Standard Specification for Gypsum Wallboard.
 - 10. ASTM C518 Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - 11. ASTM C578 Standard Specification for Perlite Thermal Insulation Board.
 - 12. ASTM C728 Standard Test Methods for Fire Test of Roof Coverings.
 - 13. ASTM C1289 Standard Specification for Faced Rigid Polyisocyanurate Thermal Insulation.
 - 14. ASTM D5 Standard Test Method for Penetration of Bituminous Materials.
 - 15. ASTM D36 Standard Test Method for Softening Point of Bitumen (Ring and Ball Apparatus).
 - 16. ASTM D312 Standard Specification for Asphalt Used in Roofing.
 - 17. ASTM D412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.
 - 18. ASTM D1621 Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
 - 19. ASTM D1622 Standard Test Method for Apparent Density of Rigid Cellular Plastics.

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- 20. ASTM D1863 Standard Specification for Mineral Aggregate Used on Built-Up Roofs.
- 21. ASTM D2126 Standard Test Method for Response of Rigid Cellular Plastics to Thermal Humid Aging.
- 22. ASTM D2178 Standard Specification for Asphalt Glass Felts used in Roofing and Waterproofing.
- 23. ASTM D4601 Standard Specification for Asphalt-Coated Glass Fiber Base Sheet Used in Roofing.
- 24. ASTM D5147 Standard Sampling and Testing Modified Bituminous Sheet Material.

- B. Cast Iron Soil Pipe Institute, Washington, D.C. (CISPI)
- C. Factory Mutual Research (FM):
 - 1. Roof Assembly Classifications.
- D. National Roofing Contractors Association (NRCA):
 - 1. Roofing and Waterproofing Manual.
- E. Underwriters Laboratories, Inc. (UL):
 - 1. Fire Hazard Classifications.
- F. Warnock Hersey (WH):
 - 1. Fire Hazard Classifications.
- G. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
- H. Steel Deck Institute, St. Louis, Missouri (SDI)
- I. Southern Pine Inspection Bureau, Pensacola, Florida (SPIB)
- J. Insulation Board, Polyisocyanurate (FS HH-I-1972)
- K. Insulation Board, Thermal (Fiberboard) (FS LLL-1-535B)

1.4 SUBMITTALS

- A. Product Data: Provide manufacturer's specification data sheets for each product in accordance with Division 01 Section Submittal Procedures. 01300.
- B. Provide approval letters from insulation manufacturer for use of their insulation within this particular roofing system type.
- C. Provide a sample of each insulation type.
- D. Shop Drawings
 - 1. Submit manufacturer's shop drawings indicating complete installation details of tapered insulation system, including identification of each insulation block,

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sequence of installation, layout, drain locations, roof slopes, thicknesses, crickets and saddles.

2. Shop drawing shall include: Outline of roof, location of drains, complete board layout of tapered insulation components, thickness and the average “R” value for the completed insulation system.

E. Certification

1. Submit roof manufacturer’s certification that insulation fasteners furnished are acceptable to roof manufacturer.
2. Submit roof manufacturer’s certification that insulation furnished is acceptable to roofing manufacturer as a component of roofing system and is eligible for roof manufacturer’s system warranty.

1.5 QUALITY ASSURANCE

- A. Fire Classification, ASTM E-108.
- B. Manufacturer’s Certificate: Certify that roof system furnished is approved by Factory Mutual, Underwriters Laboratories, Warnock Hersey or approved third party testing facility in accordance with ASTM E108, Class [A or B or C] for external fire and meets local or nationally recognized building codes.
- C. Manufacturer’s Certificate: Certify that the roof system is adhered properly to meet or exceed the requirements of FM [1-90].
- D. Pre-installation meeting: Refer to Division 07 roofing specifications for pre-installation meeting requirements.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver products to site with seals and labels intact, in manufacturer’s original containers, dry and undamaged.
- B. Store all insulation materials in a manner to protect them from the wind, sun and moisture damage prior to and during installation. Any insulation that has been exposed to any moisture shall be removed from the project site.
- C. Keep materials enclosed in a watertight, ventilated enclosure (i.e. tarpaulins).
- D. Store materials off the ground. Any warped, broken or wet insulation boards shall be removed from the site.

PART 2 – PRODUCTS

2.1 PRODUCTS, GENERAL

- A. Refer to Division 01 Section “Common Product Requirements.”

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- B. Basis of Design: Materials, manufacturer's product designations, and/or manufacturer's names specified herein shall be regarded as the minimum standard of quality required for work of this Section. Comply with all manufacturer and contractor/fabricator quality and performance criteria specified in Part 1.
- C. Substitutions: Products proposed as equal to the products specified in this Section shall be submitted in accordance with Bidding Requirements and Division 01 provisions.
 - 1. Proposals shall be accompanied by a copy of the manufacturer's standard specification section. That specification section shall be signed and sealed by a professional engineer licensed in the state in which the installation is to take place. Substitution requests containing specifications without licensed engineer certification shall be rejected for non-conformance.
 - 2. Include a list of three (3) projects of similar type and extent, located within a one hundred mile radius from the location of the project. In addition, the three projects must be at least five (5) years old and be available for inspection by the Architect, Owner or Owner's Representative.
 - 3. Equivalency of performance criteria, warranty terms, submittal procedures, and contractual terms will constitute the basis of acceptance.
 - 4. The Owner's decision regarding substitutions will be considered final. Unauthorized substitutions will be rejected.

2.2 INSULATION MATERIALS

- A. Thermal Insulation Properties and Approved Insulation Boards.
 - 1. Tapered Polyisocyanurate Roof Insulation; ASTM C1289:
 - a. Qualities: Factory Tapered, closed cell polyisocyanurate foam core bonded to heavy duty glass fiber mat facers.
 - b. Average R-Value: Minimum 23
 - c. Tapered Slope: 1/4
 - d. Compliances: UL, WH or FM listed under Roofing Systems Federal Specification HH-I-1972, Class 1
 - e. Acceptable Products:
 - 1) E'NRG'Y-2; Johns Manville
 - 2) Ultra Gard Gold; Johns Manville
 - 3) GAFTEMP Isotherm R; GAF
 - 4) Approved Equivalent
 - 2. High Density Fiberboard Roof insulation; ASTM C208
 - a. Qualities: Rigid, composed of interlocking fibers factory blended treated with asphalt on the top side.
 - b. Board Size: [Four feet by four feet (4' x 4')]
 - c. Thickness: Minimum ½"
 - d. Compliances: UL, WH, FM listed under Roofing Systems. Federal Specification LLL-I-535-B.
 - e. Acceptable Manufacturers:
 - 1) Celotex
 - 2) Temple Inland
 - 3) GAF Building Materials Corporation

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4) Approved Equivalent

2.3 RELATED MATERIALS

- A. Fiber Cant and Tapered Edge Strips: Performed rigid insulation units of sizes/shapes indicated, matching insulation board or of perlite or organic fiberboard, as per the approved manufacturer.
 - 1. Acceptable Manufacturers:
 - a. The Garland Company, Inc.
 - b. Celotex
 - c. Johns Manville
 - d. GAF
 - e. Approved Equivalent
- B. Protection Board: Premolded semi-rigid asphalt composition board one half (1/2) inch.
- C. Roof Board Joint Tape: Six (6) inches wide glass fiber mat with adhesive compatible with insulation board facers.
- D. Roof Deck Insulation Adhesive: Single component, low rise foam adhesive as recommended by insulation manufacturer and approved by FM indicated ratings.
 - 1. Tensile Strength (ASTM D412).....250 psi
 - 2. Density (ASTM D1875).....8.5 lbs./gal.
 - 3. Viscosity (ASTM D2556).....8,000 to 32,000 cP.
 - 4. 2 `Peel Strength (ASTM D903).....17 lb/in.
 - 5. 3 `Flexibility (ASTM D816).....Pass @ -70°F
- E. Fasteners: Corrosion resistant screw fastener as recommended by roof membrane manufacturer.
 - 1. Factory Mutual Tested and Approved with three (3) inches coated disc for I-90 rating, length required to penetrate metal deck one inch.

PART 3 – EXECUTION

3.1 EXECUTION, GENERAL

- A. Comply with requirements of Division 01 Section “Common Execution Requirements.”

3.2 INSPECTOR OF SURFACES

- A. Roofing contractor shall be responsible for preparing an adequate substrate to receive insulation.
 - 1. Verify that work which penetrates roof deck has been completed.
 - 2. Verify that wood nailers are properly and securely installed.
 - 3. Examine surfaces for defects, rough spots, ridges, depressions, foreign material, moisture, and unevenness.

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4. Do not proceed until defects are corrected.
5. Do not apply insulation until substrate is sufficiently dry.
6. Broom clean substrate immediately prior to application.
7. Use additional insulation to fill depressions and low spots that would otherwise cause ponding water.
8. Verify that temporary roof has been completed.

3.3 INSTALLATION

- A. Attachment with Mechanical Fasteners
 1. Approved insulation board shall be fully attached to the deck with an approved mechanical fastening system. As a minimum, the amount of fasteners shall be in accordance with manufacturer's recommendation for FM I-90 system.
Otherwise, a minimum of one fastener per two square feet shall be installed.
 2. Filler pieces of insulation require at least two fasteners per piece if size of insulation is less than four square feet.
 3. Spacing pattern of fasteners shall be as per manufacturer's recommendations to meet the FM requirements. Placement of any fastener from edge of insulation board shall be a minimum of three inches, and a maximum of six (6) inches.
 4. Minimum penetration into deck shall be as recommended by the fastener manufacturer. There is a one (1) inch minimum for metal, wood and structural concrete decks where not specified by the manufacturer. For gypsum and cement-wood fiber decks, penetration shall be determined from pull-out test results with a minimum penetration of one and one-half (1 ½) inches.
 5. Gypsum and cementitious wood fiber decks: Where the roof deck is visible from the building interior, the contractor shall ensure no penetration of fasteners through underside of the deck. Any holes or spalling caused by fastener installation shall be repaired by the roofing contractor. Where the new roof system thickness exceeds an amount so that a minimum of 1 ½ of penetration cannot be achieved with an Olympic TB Fastener, or approved equivalent, then (and only then) toggle bolts may be used to secure installation to the deck.
- B. Attachment with Insulation Adhesive Approved by Factory Mutual (FM).
 1. Ensure all surfaces are clean, dry, free of dirt, debris, oils, loose ore embedded gravel, unadhered coatings, deteriorated membrane and other contaminants that may inhibit adhesion.
 2. Apply insulation adhesive directly to the substrate using a ribbon pattern with one half (1/2) inch wide beads, using either the pail or an automatic applicator, at a rate of one (1) gallon per one hundred (150) square feet.
 3. Immediately place insulation boards into wet adhesive. Do not slide boards into place. Do not allow the adhesive to skin over before installing insulation boards.
 4. Briefly step each board into place to ensure contact with the adhesive. Substrates with irregular surfaces may prevent the insulation board from making positive contact with the adhesive. Relief cuts or temporary weights may be required to ensure proper contact.
 5. All boards shall be cut and fitted where the roof deck intersects a vertical surface. The boards shall be cut to fit a minimum of one quarter (1/4) inch away from the vertical surface.

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3.4 CLEANING

- A. Remove debris and cartons from roof deck. Leave insulation clean and dry, ready to receive roofing membrane.

3.5 CONSTRUCTION WASTE MANAGEMENT

- A. Remove and properly dispose of waste products generated during installation. Comply with requirements of authorities having jurisdiction.

END OF SECTION

SECTION 07500
SHEET METAL, FLASHING AND TRIM

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including the Conditions of the Contract and Division 01 Specification Sections apply to this section.

1.2 SUMMARY

- A. Provide all labor, equipment, and materials to fabricate and install the following.
 - 1. Edge strip and flashing
 - 2. Fascia, scuppers, and trim.
 - 3. Coping cap at parapets.
 - 4. Expansion joint and area divider covers.
 - 5. Fascia and edge metal.
 - 6. Gutters, scuppers and down spouts.
- B. Related Sections:
 - 1. Division 07 Section Common Work Results for Thermal and Moisture Protection.
- C. Related Work Specified Elsewhere:
 - 1. Division 06 Section Rough Carpentry
 - 2. Division 07 Section Modified Bituminous Membrane Roofing
 - 3. Division 07 Section Built Up Roofing
 - 4. Division 07 Section Roof Accessories
 - 5. Division 07 Section Joint Sealants
 - 6. Division 07 Section Manufactured Metal Roof Panels
 - 7. Division 07 Section Manufactured Metal Wall Panels

1.3 REFERNECES

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM A653 Standard Specification for Steel Sheet, Zinc-Coated (galvanized) or Zinc-Iron Alloy-Coated (galvannealed) by the Hot-Dip Process.
 - 2. ASTM A792 Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy Coated by Hot Dip Process.
 - 3. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - 4. ASTM B221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 5. ASTM D692 Standard Specification for Coarse Aggregate for Bituminous Paving Mixtures.
- B. American National Standards Institute and Single Ply Roofing Institute (ANSI/SPRI)
 - 1. ANSI/SPRI ES-1 Testing and Certification Listing of Shop Fabricated Edge Metal.

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- C. Warnock Hersey International, Inc., Middleton, WI (WH)
- D. Factory Mutual Research Corporation (FMRC)
- E. Underwriters Laboratories (UL)
- F. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
 - 1. 1993 Edition Architectural Sheet Metal Manual
- G. National Roofing Contractors Association (NRCA)
 - 1. Roofing and Waterproofing Manual
- H. American Society of Civil Engineers (ASCE)
 - 1. ASCE 7-05 Minimum Design Loads for Buildings and Other Structures.

1.4 SUBMITTALS FOR REVIEW

- A. Product Data:
 - 1. Provide manufacturer's specification data sheets for each product.
 - 2. Metal material characteristics and installation recommendations.
 - 3. Submit color chart prior to material ordering and/or fabrication so that equivalent colors to those specified can be approved.
- B. Samples: Submit two (2) samples, illustrating typical metal edge, coping, gutters, fascia extenders for material and finish.
- C. Shop Drawings
 - 1. For manufactured and ANSI/SPRI approved shop fabricated gravel stops, fascia, scuppers, and all other sheet metal fabrications.
 - 2. Indicate material profile, jointing pattern, jointing details, fastening methods, flashing, terminations, and installation details.
 - 3. Indicate type, gauge and finish of metal.
- D. Specimen Warranty: Provide an unexecuted copy of the warranty specified for this Project, identifying the terms and conditions required of the Manufacturer and the Owner.

1.5 SUBMITTALS FOR INFORMATION

- A. Design Loads: Any material submitted as equal to the specified material must be accompanied by a report signed and sealed by a professional engineer licensed in the state in which the installation is to take place. This report shall show that the submitted equal meets the wind uplift and perimeter attachment requirements according to ASCE 7-05 and ANSI/SPRI ES-1. Substitution requests submitted without licensed engineer approval will be rejected for non-conformance.
- B. Factory Mutual Research Corporation's (FMRC) wind uplift resistance classification: The roof perimeter flashing shall conform to the requirements as defined by the FMRC Loss Prevention Data Sheet 1-49.
- C. A letter from an officer of the manufacturing company certifying that the materials furnished for this project are the same as represented in tests and supporting data.:

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- D. Mill production reports certifying that the steel thickness are within allowable tolerances of the nominal or minimum thickness or gauge specified.
- E. Certification of work progress inspection. Refer to Quality Assurance Article below.
- F. Certifications:
 - 1. Submit roof manufacturer's certification that metal fasteners furnished are acceptable to roof manufacturer.
 - 2. Submit roof manufacturer's certification that metal furnished is acceptable to roofing manufacturer as a component of roofing system and is eligible for roof manufacturer's system warranty.

1.6 CONTRACT CLOSEOUT SUBMITTALS

- A. General: Comply with Requirements of Section 01 78 00 – Closeout Submittals.
- B. Special Project Warranty: Provide specified warranty for the Project, executed by the authorized agent of the Manufacturer.
- C. Roofing Maintenance Instructions. Provide a manual of manufacturer's recommendations for maintenance of installed roofing systems.
- D. Insurance Certification: Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

1.7 QUALITY ASSURANCE

- A. Engage an experienced roofing contractor specializing in sheet metal flashing work with a minimum of five (5) years experience.
- B. Maintain a full-time supervisor/foreman who is on the job-site at all times during installation. Foreman must have a minimum of five (5) years experience with the installation of similar system to that specified.
- C. Source Limitation: Obtain components from a single manufacturer. Secondary products which cannot be supplied by the specified manufacturer shall be approved in writing by the primary manufacturer prior to bidding.
- D. Upon request fabricator/installer shall submit work experience and evidence of financial responsibility. The Owner's representative reserves the right to inspect fabrication facilities in determining qualifications.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened containers or packages with labels intact and legible.
- 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.

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1.9 PROJECT CONDITIONS

- A. Determine that work of other trades will not hamper or conflict with necessary fabrication and storage requirements for pre-formed metal edge system.

1.10 DESIGN AND PERFORMANCE CRITERIA

- A. Thermal expansion and contraction:
 - 1. Completed metal edge flashing system shall be capable of withstanding expansion and contraction of components caused by changes in temperature without buckling, producing excess on structure, anchors or fasteners, or reducing performance ability.

1.11 WARRANTIES

- A. Owner shall receive one (1) warranty from manufacturer of roofing materials relating to this section, covering all of the following criteria. Multiple warranties are not acceptable.
 - 1. Pre-finished metal material shall require a written twenty (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 D2244 or chalking excess of 8 unites per ASTM D659. If either occurs material shall be replaced per warranty, at no cost to the Owner.
 - 2. Changes: Changes or alterations in the edge metal system without prior written consent from the manufacturer shall render the system unacceptable for a warranty.
 - 3. Warranty shall commence on date of substantial completion or final payment, whichever is agreed by contract.
 - 4. 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 two 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.
 - 5. Installing roofing contractor shall be responsible for the installation of the edge metal system in general accordance with the membrane manufacturer's recommendations.
 - 6. Installing contractor shall certify that the edge metal system has been installed per the manufacturer's printed details and specifications.
 - 7. One manufacturer shall provide a single warranty for all accessory metal for flashings, metal edges and copings, along with the warranty for metal roof areas, membrane roof areas, and any transitions between two different material types.

PART 2 – PRODUCTS

2.1 PRODUCTS, GENERAL

- A. Refer to Division 01 Section "Common Product Requirements."
- B. Basis of Design: Materials, manufacturer's product designations, and/or manufacturer's names specified herein shall be regarded as the minimum standard of quality required for work of this Section. Comply with all manufacturer and

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contractor/fabricator quality and performance criteria specified in Part 1.

- C. Substitutions: Products proposed as equal to the products specified in this Section shall be submitted in accordance with Bidding Requirements and Division 01 provisions.
1. Proposals shall be accompanied by a copy of the manufacturer's standard specification section. That specification section shall be signed and sealed by a professional engineer licensed in the state in which the installation is to take place. Substitution requests containing specifications without licensed engineer certification shall be rejected for non-conformance.
 2. Include a list of three (3) projects of similar type and extent, located within a one hundred mile radius from the location of the project. In addition, the three projects must be at least five (5) years old and be available for inspection by the Architect, Owner or Owner's Representative.
 3. Equivalency of performance criteria, warranty terms, submittal procedures, and contractual terms will constitute the basis of acceptance.
 4. The Owner's decision regarding substitutions will be considered final. Unauthorized substitutions will be rejected.

2.2 ACCEPTABLE MANUFACTURERS

- A. The design is based upon roofing systems engineered and manufactured by

The Garland Company
3800 East 91st Street
Cleveland, Ohio 44105
Telephone: (800) 762-8225
Website: www.garlandco.com

2.3 MATERIALS

- A. General: Product designations for the materials used in this section shall be based on performance characteristics of the R-MER Edge System manufactured by The Garland Company, Cleveland, OH, and shall form the basis of the contract documents.
- B. Materials:
1. Minimum gauge of steel or thickness of Aluminum to be specified in accordance with Architectural Sheet Metal Manual, Sheet Metal and Air Conditioning Contractor's National Association, Inc. recommendations
 2. Unexposed base metal material:

R-Mer Edge Fascia
 - A. Zinc-coated steel, ASTM A653, coating designation G-90, in thickness of 0.0299 nom./22 gauge, 36" to 48" by coil length, chemically treated, commercial or lock-forming quality. All curved sections of material shall be fabricated of one continuous piece of aluminum.

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R-Mer Edge Coping Chairs

- A. Zinc-coated steel, ASTM A653, coating designation G-90, in thickness of 0.0635 nom./ 16 gauge, 36" to 48" by coil length, chemically treated, commercial or lock-forming quality.

3. Exposed base metal material:

R-Mer Edge Fascia

- A. Anodized Aluminum, ASTM B209, alloy 3105-H14, in thickness of .063" nom.

R-Mer Edge Coping

- A. Anodized Aluminum, ASTM B209, alloy 3105-H14, in thickness of .063" nom.

- A. Fascia for headworks building and solids building to be provided by MBCI and shall be aluminum of 0.063" nom thickness. "Artisan" style fascia with non exposed connectors. All connections and fasteners of dissimilar metals shall be coated.

4. All colors by owner.

C. Finishes:

1. Exposed surfaces for coated panels:

- a. Steel Finishes: fluorocarbon finish. Epoxy primer baked both sides, .2-.25 mils thickness as approved by finish coat manufacturer.
- b. Aluminum finishes: Kynar -500 coated during fabrication

Weathering finish as referred by National Coil Coaters Association (NCCA).

PROPERTY	TEST METHOD	FLUOROCARBON
Pencil Hardness	ASTM D3363 NCCA II-2	HB-H
Bend	ASTM D-4145 NCCA II-19	O-T
Cross-Hatch Adhesion	ASTM D3359	no loss of adhesion
Gloss (60° angle)	ASTM D523	25+/-5%
Reverse Impact	ASTM D2794	no cracking or loss of adhesion
Nominal Thickness	ASTM D1005	

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Primer	0.2 mils
Topcoat	0.8 mils
TOTAL	1.0 mils

*Subject to minimum quantity requirements

- c. Color shall be as specified
- 2. Exposed and unexposed surfaces for mill finish flashing, fascia, and coping cap, shall be as shipped from the mill.
- 3. Exposed and unexposed surfaces for anodized aluminum flashing, fascia, and coping cap, shall be as shipped from mill.

2.4 RELATED MATERIALS AND ACCESSORIES

- A. Metal Primer: Zinc chromate type.
- B. Plastic Cement: ASTM D 4586
- C. Sealant: Specified in Section 07900 or on drawings.
- D. Underlayment: ASTM D2178, No15 asphalt saturated roofing felt.
- E. Slip Sheet: Rosin sized building paper.
- F. Fasteners:
 - 1. Corrosion resistant screw fastener as recommended by metal manufacturer.
Finish exposed fasteners same as flashing metal.
 - 2. Fastening shall conform to Factory Mutual requirements or as stated on section details, whichever is more stringent.
- G. Gutter and Downspout Anchorage Devices: Material as specified for system.

PART 3 – EXECUTION

3.1 EXECUTION, GENERAL

- A. Refer to Division 07 Section Common Work Results for Thermal and Moisture Protection.

3.2 PROTECTION

- A. Isolate metal products from dissimilar metals, masonry or concrete with bituminous paint, tape, or slip sheet. Use gasketed fasteners where required to prevent corrosive reactions.

3.3 GENERAL

- A. Secure fascia to wood nailers at bottom edge with a continuous cleat.
- B. Fastening of metal to walls and wood blocking shall comply with building code standards.

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- 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. Allow sufficient clearances for expansion and contraction of linear metal components. Secure metal using fasteners as required by the system. Exposed face fastening will be rejected.

3.4 INSPECTION

- A. Verify that curbs are solidly set and nailing strips located.
- B. Perform field measurements prior to fabrication.
- C. Coordinate work with work of other trades.
- D. Verify that substrate is dry, clean and free of foreign matter.
- E. Commencement of installation shall be considered acceptance of existing conditions.

3.5 MANUFACTURED SHEET METAL SYSTEMS

- A. Furnish and install manufactured fascia and coping cap systems in strict accordance with manufacturer's printed instructions.
- B. Provide factory-fabricated accessories including, but not limited to, fascia extenders, miters, scuppers, joint covers, etc. Refer to Source limitation provision in Part 1.

3.6 SHOP-FABRICATED SHEET METAL

- A. Metal work shall be shop fabricated to configurations and forms in accordance with recognized sheet metal practices.
- B. Hem exposed edges.
- C. Angle bottom edges of exposed vertical surfaces to form drip.
- D. Lap corners with adjoining pieces fastened and set in sealant.
- E. Form joints for gravel stop fascia system, coping cap with a 3/8" opening between sections. Back the opening with an internal drainage plate formed to the profile of fascia piece.
- F. Install sheet metal to comply with referenced ANSI/SPRI, SMACNA and NRCA standards.

3.7 FLASHING MEMBRANE INSTALLATION

- A. Scupper Through Roof Edge
 1. Install copper box in a one fourth (1/4) inch bed of mastic. Assure all box seams are soldered and have minimum four (4) inch flange. Make sure all corners are closed and soldered.
 2. Prime metal edge at a rate of one hundred (100) square feet per gallon and allow

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to dry.

B. Snap On Fascia Detail

1. Position base plies of the Built-Up and/or Modified Roofing membrane over the roof edge covering nailers completely, fastening eight (8) inches on center. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.
2. Install scupper boxes and miters first.
3. Cant Dam: Install Cant Dam with roofing nails twelve (12) inches on center through the top of metal flange and outside face.
4. BUR or Modified Flashing: Prime Cant Dam at a rate of one hundred (100) square feet per gallon and allow to dry. Strip in Cant Dam with base flashing membrane extending six (6) inches into roof field, followed with a cap sheet extending nine (9) inches into the roof field. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.
5. Fascia Cover: Install fascia cover with a splice plate under one end by pressing downward firmly until "snap" occurs and cover is engaged along entire length of miter. Field cut where necessary with fine tooth saw. Sealant is to be placed approximately one (1) inch from fascia cover joint.

C. Extruded Fascia Detail

1. Position base plies of the Built-up and/or Modified Roofing membrane over the roof edge covering nailers completely, fastening eight (8) inches on center. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.
2. Install scupper boxes and miters first.
3. Cant Dam: Install Cant Dam with roofing nails twelve (12) inches on center through the top of metal flange and outside face.
4. BUR or Modified Flashing: Prime Cant Dam at a rate of one hundred (100) square feet per gallon and allow to dry. Strip in Cant Dam with base flashing membrane extending six (6) inches into roof field, followed with a cap sheet extending nine (9) inches into the roof field. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.

D. Drip Edge Detail

1. Position base plies of the Built-Up and/or Modified Roofing membrane over the roof edge covering nailers completely, fastening eight (8) inches on center. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.
2. Install continuous cleat on face of nailer and fasten six (6) inches on center.
3. Install new Drip Edge hooked to continuous cleat. Set metal flange into roofing cement, nail every three (3) inches on center, and prime at a rate of one hundred (100) square feet per gallon.
4. Drip Edge flange with base flashing membrane extending six (6) inches into roof field, followed with a cap sheet extending nine (9) inches into the roof field. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.

E. Gravel Stop Detail

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1. Position base plies of the Built-Up and/or Modified Roofing membrane over the roof edge covering nailers completely, fastening eight (8) inches on center. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.
 2. Install continuous cleat on face of nailer and fasten six (6) inches on center.
 3. Install new Gravel Stop hooked to continuous cleat. Set metal flange into roofing cement, nail every three (3) inches on center, and prime at a rate of one hundred (100) square feet per gallon.
 4. Strip in Gravel Stop flange with base flashing membrane extending six (6) inches into roof field, followed with a cap sheet extending nine (9) inches into the roof field. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.
- F. Edge Metal With Gutter (Where required)
1. Position base plies of the Built-Up and/or Modified Roofing membrane over the roof edge covering nailers completely, fastening eight (8) inches on center. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.
 2. Install gutter and strapping fastening six (6) inches on center.
 3. Install continuous cleat on face of nailer and fasten six (6) inches on center.
 4. Install new edge metal hooked to continuous cleat. Set metal flange into roofing cement, nail every three (3) inches on center, and prime at a rate of one hundred (100) square feet per gallon.
 5. Strip in edge metal with base flashing membrane extending six (6) inches into roof field, followed with a cap sheet extending nine (9) inches into the roof field. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.
- G. Snap-On Coping Cap Detail
1. Install Miters first.
 2. Position base flashing of the Built-Up and/or Modified Roofing membrane over the wall edge covering nailers completely, fastening eight (8) inches on center. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.
 3. Install minimum sixteen (16) gauge, sixteen (16) inch long by specified width anchor chair at [Contact Garland Representative] feet on center.
 4. Install six (6) inch wide splice plate by centering over sixteen (16) inch long by specified width anchor chair. Apply two beads of sealant to either side of the splice plate's center. Approximately two (2) inches from the coping cap joint. Install Coping Cap by hooking outside hem of coping on outside face of anchor chair. Press downward on inside edge of coping until "snap" occurs and hem is engaged on the entire chair.

3.8 CLEANING

- A. Clean installed work in accordance with the manufacturer's instructions.
- B. Replace damaged work than cannot be restored by normal cleaning methods.

3.9 CONSTRUCTION WASTE MANAGEMENT

- A. Remove and properly dispose of waste products generated. Comply with

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SHEET METAL, FLASHING AND TRIM

requirements of authorities having jurisdiction.

3.10 FINAL INSPECTION

- A. At completion of installation and associated work, meet with Contractor, Architect, installer, installer of associated work, Owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of roofing system.
- B. Inspect work and flashing of roof penetrations, walls, curbs and other equipment. List all items requiring correction or completion and furnish a copy of list to each party in attendance.
- C. Repair or replace deteriorated or defective work found at time above inspection as required to produce an installation which is free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- D. Notify the [Contractor] [Architect] [Owner] upon completion of corrections.
- E. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.
- F. Immediately correct roof leakage during construction. If the Contractor does not respond within twenty-four (24) hours, the Owner will exercise rights to correct the Work under the terms of the Conditions of the Contract.

3.11 DEMONSTRATION AND TRAINING

- A. At a time and date agreed to by the Owner, instruct the Owner's facility manager, or other representative designated by the Owner, on the following procedures:
 - 1. Troubleshooting procedures.
 - 2. Notification procedures for reporting leaks or other apparent roofing problems.
 - 3. Maintenance.
 - 4. The Owner's obligations for maintaining the warranty in effect and force.
 - 5. The Manufacturer's obligations for maintaining the warranty in effect and force.

END OF SECTION

SECTION 07531
ADHERED EPDM MEMBRANE ROOFING SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Adhered membrane roofing system.
 - 2. Roof insulation.
 - 3. Membrane manufacturers metal fascia system.

1.2 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.
- B. Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," before multiplication by a safety factor.
- C. Factored Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," after multiplication by a safety factor.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.
- C. Roofing System Design: Provide a membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE 7.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.
- C. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

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1. Submit evidence of meeting performance requirements.
- D. Qualification Data: For Installer and manufacturer.
- E. Warranties: Special warranties specified in this Section.
- F. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.
- G. Shop Drawings: Submit shop drawings showing all termination details and tapered insulation layouts.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.
- B. Source Limitations: Obtain components for membrane roofing system from same manufacturer as roofing membrane or approved by roofing membrane manufacturer.
- C. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.
 1. Exterior Fire-Test Exposure: Class A ASTM E 108, for application and roof slopes indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

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ADHERED EPDM MEMBRANE ROOFING SYSTEM

- E. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- F. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

1.7 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.
 - 1. Special warranty includes roofing membrane, base flashings, roofing accessories, roof insulation, fasteners, substrate board, metal fascia and other components of membrane roofing system.
 - 2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 EPDM ROOFING MEMBRANE

- A. EPDM Roofing Membrane: ASTM D 4637, Type I, non-reinforced uniform, flexible sheet made from EPDM, and as follows:
 - 1. Available Manufacturers:
 - a. The Garland Company
 - b. Versico, Inc
 - 2. Thickness: 60 mils, nominal.
 - 3. Exposed Face Color: Black

2.2 MATERIALS

- A. General: All materials shall be recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
 - 1. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: 60-mil thick EPDM, partially cured or cured, according to application.
- C. Bonding Adhesive: Manufacturer's standard bonding adhesive.

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- D. Seaming Material: Manufacturer's standard synthetic-rubber polymer primer and 6-inch- wide minimum, butyl splice tape with release film.
- E. Lap Sealant: Manufacturer's standard single-component sealant, color to match roofing membrane.
- F. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.
- G. Insulation Adhesive: Membrane manufacturers 2 part low rise polyurethane foam adhesive.
- H. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.
- I. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, , T-joint covers, in-seam sealants, cover strips, and other accessories.
- J. Vapor Retarder: Two (2) layers of Type 4 fiberglass felts set in Type 3 asphalt.

2.3 ROOF INSULATION

- A. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class I, Grade 2, felt or glass-fiber mat facer on both major surfaces.
 - 1. Available Manufacturers:
 - a. Carlisle SynTec Incorporated.
 - b. Versico, Inc
 - 2. Product Thickness
 - a. Provide 1/8" per foot tapered insulation with an average R-Value of 19. Tapered Insulation shall be provided and installed as shown on the drawing.

2.4 INSULATION ACCESSORIES

- A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

2.5 PARAPET COPING SYSTEM –SEE SECTION 07500 for requirements of flashing, fascia, coping fasteners, materials, connectors, etc.

2.6 WALKWAYS

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ADHERED EPDM MEMBRANE ROOFING SYSTEM

- A. Preformed walkway boards: Molded reprocessed rubber manufactured or recommended by membrane manufacturer, 24 by 36 by $\frac{3}{4}$ inch size.
 - 1. Walkway board adhesive: As recommended by membrane manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Verify that the existing surfaces are clean, smooth and suitable for installation of roof system.
- B. Fill any variations or depressions in concrete roof deck surface with latex overlay.
- C. No roofing work is to be done during inclement weather of any degree. Temperature shall be 40°F and rising. No roofing work unless roof deck is completely dry, free from any water, dew, frost, ice or snow. Follow manufacturers' instructions for storage, handling, and use of materials during cold weather.

3.2 VAPOR RETARDER AND INSULATION INSTALLATION

- A. General:
 - 1. Apply vapor retarder to deck surface with adhesive in accordance with manufacturer's instructions.
 - 2. Attach insulation with hot asphalt.
 - 3. Only install that quantity of insulation which can be covered with membrane within the workday or before start of unacceptable weather conditions.
 - 4. Butt units tightly together, trim to fit penetrations and interruptions, so that gaps between units and between insulation and adjacent construction do not exceed $\frac{1}{4}$ inch.
 - 5. Trim insulation or provide preshaped units at drains to provide positive slope for 24 inches around drain.
 - 6. Shape insulation or provide preformed units to provide crickets, saddles, and tapered areas as indicated or as required to provide drainage.
- B. Uniform Thickness Insulation:
 - 1. Install insulation in two layers using adhesive, with end joints staggered.

3.3 INSULATION INSTALLATION

- A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system manufacturer's written instructions for installing roof insulation.
- C. Install two layers of insulation under area of roofing to achieve required thickness. Install insulation with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.

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- D. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
 - 1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
- E. Adhered Insulation: Install each layer of insulation and secure to deck using two part low rise polyurethane foam insulation adhesive as supplied by the manufacturer of the roofing system.
 - 1. Fasten insulation according to membrane manufacturers requirements.
 - 2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

3.4 ADHERED ROOFING MEMBRANE INSTALLATION

- A. Install roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.
- B. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- C. Bonding Adhesive: Apply bonding adhesive to substrate and underside of roofing membrane at rate required by manufacturer and allow to partially dry before installing roofing membrane. Do not apply bonding adhesive to splice area of roofing membrane.
- D. Apply roofing membrane with side laps shingled with slope of roof deck where possible.
- E. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping roofing membranes according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing membrane terminations.
- F. Repair tears, voids, and lapped seams in roofing that does not meet requirements.

3.5 BASE FLASHING INSTALLATION (See section 07500 for additional requirements)

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.
- E. Terminate and seal top of sheet flashings.

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3.6 METAL FASCIA

- A. Install metal fascia according to roofing manufacturer's specifications. See section 07500)

3.7 FIELD QUALITY CONTROL

- A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
- B. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.

3.8 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

3.9 WALKWAYS

- A. Install walkways at all traffic concentration points (such as roof hatches, access doors, etc.) and all locations as identified on the drawing
- B. Adhere walkways to the EPDM membrane in accordance with the manufacturer's specifications.

END OF SECTION

SECTION 08220
FIBERGLASS REINFORCED PLASTIC (FRP) DOORS AND
FRAMES

PART I GENERAL

1.01 SUMMARY

- A. This section includes the following:
 - 1. Fiberglass Reinforced Plastic (FRP) Doors
 - 2. Fiberglass Resin Transfer Molded Door Frames

1.02 QUALITY ASSURANCE

- A. Referenced Standards
 - 1. Door Properties
 - a. ASTM C 518 Standard test method for steady for state thermal transmission properties by means of the heat flow meter apparatus.
 - 2. Laminate Properties
 - a. ASTM D 882 Tensile Strength
 - b. ASTM D 790 Flexural Strength
 - c. ASTM D 2583 Barcol Hardness
 - d. ASTM D 256 Impact Resistance
 - e. ASTM D 792 Density/Specific Gravity Of Laminate
 - f. ASTM D 1761 Mechanical Fasteners
 - g. ASTM E 84 Surface Burning Characteristics
 - h. ASTM G 155 Gelcoat Xenon Arc light exposure test
 - i. 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
 - 3. Core Properties
 - a. ASTM C 177 Thermal Properties
 - b. ASTM D 1622 Density/Specific Gravity
 - c. ASTM E 84 Surface Burning Characteristics
 - d. WDMA TM-10 and TM-5 Firestop ASTM E 152 U.L. 10(b)
- B. Qualifications
 - 1. Manufacturer Qualifications: A company specialized in the manufacture of fiberglass reinforced plastic (FRP) doors and frames as specified herein with a minimum of 25 years documented experience and with a record of successful in-service performance for the applications as required for this project.
 - 2. Installer Qualifications: An experienced installer who has completed fiberglass door and frame installations similar in material, design, and extent to those indicated and whose work has resulted in construction with a record of successful in-service performance.
 - 3. Source Limitations: Obtain fiberglass reinforced plastic doors and resin transfer molded frames through one source fabricated from a single manufacturer, including fire rated fiberglass frames.
 - 4. Source Limitations: Hardware and accessories for all FRP doors as specified in Section 08710 shall be provided and installed by the fiberglass door and frame manufacturer.

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FRAMES

5. Source Limitations: Glass for windows in doors shall be furnished and installed by door and frame manufacturer in accordance with related section, Division 8, Glazing.

1.03 SUBMITTALS

- A. Product Technical Data Including:
 1. Acknowledgment that products submitted meet requirements of standards referenced.
 2. Manufacturer shall provide certificate of compliance with current local and federal regulations as it applies to the manufacturing process.
 3. Manufacturer's installation instructions.
 4. Schedule of doors and frames indicating the specific reference numbers as used on drawings, door type, frame type, size, handing and applicable hardware.
 5. Details of core and edge construction. Include factory-construction specifications.
 6. Certification of manufacturer's qualifications.
- B. Submittal drawings for customer approval shall be submitted prior to manufacture and will include the following information and formatting.
 1. Summary door schedule indicating the specific reference numbers as used on owner's drawings, with columns noting door type, frame type, size, handing, accessories and hardware.
 2. A drawing depicting front and rear door elevations showing hardware with bill of material for each door.
 3. Drawing showing dimensional location of each hardware item and size of each door.
 4. Individual part drawing and specifications for each hardware item and FRP part or product.
 5. Construction and mounting detail for each frame type.
 6. Submit color charts with the manufacturer's standard colors. The intent will be to match the FRP doors, the steel door paint and the overhead doors.
- C. Samples:
 1. Provide one 21 x 18 inch completely assembled (hinged) door and frame corner section, with faces and edges representing typical color and finish. One edge should be exposed for view of interior door and frame composition. Sample should include 6 inch lite opening, as required, as well as standard cutouts for hinges and strike plates.
- D. Operation and Maintenance Manual
 1. Include recommended methods and frequency for maintaining optimum condition of fiberglass doors and frames under anticipated traffic and use conditions.
 2. Include one set of final as built drawings with the same requirements as mentioned in Section B above.

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FRAMES

3. Include certificate of warranty for door and frame listing specific door registration numbers.
4. Include hardware data sheets and hardware manufacturer's warranties.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Each door and frame shall be delivered individually crated for protection from damage in cardboard containers, clearly marked with project information, door location, specific reference number as shown on drawings, and shipping information. Each crate shall contain all fasteners necessary for installation as well as complete installation instructions.
- B. Doors shall be stored in the original container on edge, out of inclement weather for protection against the elements.
- C. Handle doors pursuant to the manufacturer's recommendations as posted on outside of crate.

1.05 WARRANTY

- A. Warranty all fiberglass doors and frames for a period of 25 years against failure due to corrosion. Additionally, warranty all fiberglass doors and frames on materials and workmanship for a period of 10 years, including warp, separation or delamination, and expansion of the core.

PART II PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

- A. Chem-Pruf Door Co., Ltd.
- B. Approved Equal.

2.02 FRP DOORS

- A. Doors shall be made of fiberglass reinforced plastic (FRP) using chemically proven resins resistant to contaminants typically found in the environment for which these specifications are written. Doors shall be 1 3/4 inch thick and of flush construction, having no seams or cracks. All doors up to 4'0 x 8'0 shall have equal diagonal measurements with a maximum tolerance of +/- 1/32 inch.
- B. Door Plates shall be 1/8 inch thick, molded in one continuous piece, starting with a 25 mil gelcoat (color shall be by Owner), integrally molded with at least three layers of 1.5 ounce per square foot fiberglass mat and one layer of 18 ounce per square yard woven roving. Door plate weight shall not be less than 0.97 lbs per square foot at a ratio of 30/70 glass to resin.

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FRAMES

- C. Stiles and Rails shall be constructed starting from the outside toward the inside, of a 25 mil gel coat of the color specified followed by a matrix of at least three layers of 1.5 ounce per square foot of fiberglass mat. The stile and rail shall be molded in one continuous piece to a U-shaped configuration and to the exact dimensions of the door. In this manner there will be no miter joints or disparate materials used to form the once-piece stile and rail.
- D. Core material options to be a phenolic impregnated honeycomb core, or a 2 psf expanded polyurethane foam, which completely fills all voids between the door plates. Foam properties ASTM E-84 that comply with IBC Code.
- E. Internal Reinforcement shall be #2 SPF of sufficient amount to adequately support required hardware and function of same.
- F. Finish of door and frame shall be identical in color and finish (color shall be by Owner). At time of manufacture, 25 mil of resin-rich gelcoat must be integrally molded into both the door and frame. Secondary painting to achieve color is not acceptable.
- G. Window openings shall be provided for at time of manufacture and shall be completely sealed so that the interior of the door is not exposed to the environment. Fiberglass retainers, which hold the glazing in place, shall be resin transfer molded with a profile that drains away from glazing. Mechanical fasteners shall not be used to attach retainers. The retainers must match the color finish of the door plates. Glass shall be furnished and installed by door and frame manufacturer. At time of manufacture, 25 mil of resin-rich gelcoat must be integrally molded into the window and window retainer.
- H. Louver openings shall be completely sealed so that the interior of the door is not exposed to the environment. Louvers are to be solid fiberglass "V" vanes and shall match the color, and finish of the door plates. At time of manufacture, 25 mil of resin-rich gelcoat must be integrally molded into louver and louver retainer.
- I. Transoms shall be identical to the doors in construction, materials, thickness and reinforcement.

PART III EXECUTION

3.01 INSTALLATION CONDITIONS

- A. Verification of Conditions
 1. Verify openings are correctly prepared to receive doors and frames.
 2. Verify openings are correct size and depth in accordance with shop drawings or submittals.
- B. Installer's Examination

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FRAMES

1. Door installer shall examine conditions under which construction activities of this section are to be performed and submit a written report to general contractor if conditions are unacceptable.
2. General Contractor shall submit two copies of the installer's report to the architect within 24 hours of receipt.
3. Installer shall not proceed with installation until all unacceptable conditions have been corrected.

3.02 INSTALLATION

- A. Install door-opening assemblies in accordance with shop drawings and manufacturer's printed installation instructions, using installation methods and materials specified in installation instructions.
- B. Field alteration of doors or frames to accommodate field conditions is strictly prohibited.
- C. Site tolerances: Maintain plumb and level tolerance specified in manufacturer's printed installation instructions.
- D. Fire labeled doors and frames must be installed in strict accordance with manufacturer's instructions and the latest revision of NFPA 80.

3.03 ADJUSTING

- A. Adjust doors in accordance with door manufacturer's maintenance instructions to swing open and shut without binding and to remain in place at any angle without being moved by gravitational influence.
- B. Adjust door hardware to operate correctly in accordance with hardware manufacturer's maintenance instructions.

3.04 CLEANING

- A. Clean surfaces of door opening assemblies and exposed door hardware in accordance with respective manufacturer's maintenance instructions.

3.05 PROTECTION OF INSTALLED PRODUCTS

- A. Protect door opening assemblies and door hardware from damage by subsequent construction activities until final inspection.

END OF SECTION

SECTION 09900
CONSTRUCTION AND RESTORATION PAINTING

PART 1 GENERAL

1.01 DEFINITIONS

- A. The word “paint” in this Section refers to substrate cleaners, fillers, sealers, primers, undercoats, enamels and other first, intermediate, last or finish coatings.
- B. The word “primer” in this Section refers to substrate cleaners, fillers, sealers, undercoats, and other first or intermediate coats beneath the last or finish coating.
- C. The words “finish paint” in this Section refer to the last or final coat and previous coats of the same material or product directly beneath the last or final coat.
- D. Finish Paint Systems: Finish paint and primers applied over the same substrate shall be considered a paint system of products manufactured or recommended by the finish coat manufacturer.
 - 1. Finish paint products shall meet or exceed specified minimum physical properties.
- E. Without limiting the general aspects of other requirements of these specifications, all surface preparation, coating and painting of interior and exterior surfaces shall conform to the applicable requirements of the Steel Structures Painting Council, ASTM, current Local and Federal Health Standards, and the coating/paint manufacturer's printed instructions.

1.02 SUBMITTALS

- A. Painting Schedule: Cross-referenced Painting Schedule listing all exterior and interior substrates to be painted and specified finish paint type designation; product name and manufacturer, recommended primers and product numbers, and finish paint color designation for each substrate to be painted.
 - 1. Designate exterior substrates by building name and number, substrate to be painted and surface location.
 - 2. Designate interior substrates by building name and number, floor, room name and number, and surface to be painted.
- B. Product Data Sheets: Manufacturer's published product data sheets describing the following for each finish paint product to be applied:
 - 1. Percent solids by weight and volume, solvent, vehicle, weight per gallon, ASTM D 523 gloss/reflectance angle, recommended wet and dry film thickness, volatile organic compound (VOC) content in lbs/gallon, product use limitations and environmental restrictions, substrate surface preparation methods, directions and precautions for mixing and thinning, recommended application methods, square foot area coverage per gallon, storage instructions, and shelf-life expiration date.
 - 2. Manufacturer's recommended primer for each finish paint product and substrate to be painted.
 - 3. Manufacturer's complete range of available colors for each finish paint product to be applied.

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CONSTRUCTION AND RESTORATION PAINTING

- C. Finish Paint Type Samples: Two finish paint samples applied over recommended primers for each substrate to be painted.
 - 1. Samples shall be in the designated color and specified ASTM D 523 reflectance.
 - 2. Label each sample with the following information:
 - a. Project number and Painting Schedule designation describing substrates and locations represented by the sample.
 - b. Finish paint and primer manufacturer, product names and numbers, finish paint color and reflectance.
 - 3. Leave a 1 inch wide exposed strip of unpainted substrate and each coat of primer and finish paint.
 - 4. Sample Sizes:
 - a. Sheet Metals: 4 inch by 8 inch flat sheets.
 - b. Bar and Tubular Metals: 8 inch long bars or tubular stock.
 - 5. Steel Primer and Finish Coat Samples
 - 1. Self-Primer: 1 quart, each type specified.
 - 2. Finish Coat: 1 quart, each type specified
- D. Quality Control Submittals:
 - 1. Test Reports: Furnish certified test results from an independent testing laboratory, showing that products submitted comply with the specifications, when requested by the Director's Representative
 - 2. Certificates: Furnish certificates of compliance required under QUALITY ASSURANCE Article.

1.03 QUALITY ASSURANCE

- A. Volatile Organic Compounds (VOCs) Regulatory Requirements: Chapter III of Title 6 of the official compilation of Codes, Rules and Regulations of the State of New York (Title 6 NYCRR), Part 205 Architectural Surface Coatings.
 - 1. Certificate of Compliance: List of each paint product to be delivered and installed. List shall include written certification stating that each paint product listed complies with the VOC regulatory requirements in effect at the time of job site delivery and installation.
- B. Provide materials for each system type from a single manufacturer.
- C. Container Labels: Label each product container with paint manufacturer's name, product name and number, color name and number, thinning and application instructions, date of manufacture, shelf-life expiration date, required surface preparations, recommended coverage per gallon, wet and dry film thickness, drying time, and clean up procedures.
- D. Field Examples:
 - 1.
 - 2. Field examples to be applied on actual substrates to be painted and shall duplicate earlier approved paint samples.
 - a. Interior paint examples shall be applied in rooms with the same product intended for use.

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- b. Field Example Minimum Wet and Dry Film Thickness: As indicated on approved product data sheet.
 - c. Application: Apply each coat in a smooth uniform wet mil thickness without brush marks, laps, holidays, runs, stains, cloudiness, discolorations and other surface imperfections.
 - 1) Leave a specified exposed width of each previous coat beneath each subsequent coat of finish paint and primer.
 - c. Use of Field Examples: Field examples shall serve as a quality control standard for acceptance or rejection of painting Work to be done under this Section.
 - 3. Field Example Sizes:
 - a. Floor, Ceiling and Wall Examples: 100 square feet with 1 foot wide strips
 - b. Door and Frame Example: One door and Frame with 12" wide strips
 - c. Linear Substrate Examples: 20 lineal feet with 12 inch long strips.
 - 4. Do not begin applying paints represented by field examples until examples have been reviewed and approved by the Engineer.
 - a. Protect and maintain approved field examples until all painting work represented by the example has been completed and approved.
- D. Compatibility of Paint Materials: Primers and intermediate paints shall be products manufactured or recommended by the finish paint manufacturer.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to the Site in original, unopened containers and cartons bearing manufacturer's printed labels. Do not deliver products which have exceeded their shelf life, are in open or damaged containers or cartons, or are not properly labeled as specified. Materials exceeding storage life recommended by the manufacturer shall be rejected.
- B. Storage and Handling: Store products in a dry, well ventilated area in accordance with manufacturer's published product data sheets. Storage location shall have an ambient air temperature between 45 degrees F and 90 degrees F.

1.05 PROJECT CONDITIONS

- A. Environmental Requirements:
 - 1. Ambient Air Temperature, Relative Humidity, Ventilation, and Surface Temperature: Comply with paint manufacturer's published product data sheet or other printed product instructions.
 - 2. If paint manufacturer does not provide environmental requirements, use the following:
 - a. Ambient Air Temperature: Between 45 degrees F and 75 degrees F.
 - b. Relative Humidity: Below 75 percent.

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- c. Ventilation: Maintain the painting environment free from fumes and odors throughout the Work of this Section.
 - d. Surface Temperature: At least 5 degrees F above the surface dew point temperature.
- 3. Maintain environmental requirements throughout the drying period.
- B. The following items are not to be field painted unless otherwise specified, noted or directed:
 - 1. Stainless steel, chrome plated surfaces, brass copper or aluminum.
 - 2. Piping or ductwork to be insulated.
 - 3. Steel to be cast in concrete
 - 4. Uninsulated mechanical equipment with factory applied finish.
 - 5. Unexposed galvanized items
 - 6. Top flanges of structural beams and girders in composite concrete-steel construction
- C. In locations where flammable vapors may be present, take positive action to prevent ignition by eliminating and controlling sources of ignition.
 - 1. Sources of ignition may include open flames, lightning, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electrical and mechanical), spontaneous ignition, chemical and physical-chemical reactions, and radiant heat.
- D. Provide mechanical ventilation adequate to remove flammable vapors to a safe location and to confine and control combustible residues so that life or property is not endangered.
 - 1. Equipment used to control hazardous exposure shall be explosion-proof.
 - 2. Keep mechanical ventilation in operation at all times while coating or painting operations are being conducted and for a sufficient time thereafter to allow flammable vapors from drying coatings or paints to be exhausted. Ventilation shall reduce the concentration of air contaminant to the degree a hazard does not exist. The exhaust discharge point of fumes shall be not less than ten feet from any combustible exterior wall or roof nor shall the discharge be in the direction of any combustible construction or unprotected opening in any non-combustible exterior wall within 50 feet.
- E. Provide adequate illumination while work is in progress, including explosion-proof lights and electrical equipment.
 - 1. Whenever required by the Director's Representative, provide additional illumination and necessary supports to cover all areas to be inspected.
 - 2. The level of illumination for inspection purposes shall be determined by the Director's Representative.
- F. Comply fully with the manufacturer's recommendations as to environmental conditions under which the coating and coating systems can be applied

1.06 SAFETY AND HEALTH REQUIREMENTS

- A. Provide and require use of personnel protective equipment for persons working in or about the project Site, all in accordance with requirements set forth by regulatory agencies applicable to the construction industry, the coating

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manufacturer's printed instructions, and appropriate technical bulletins and manuals.

1. Protective helmets shall be worn by all persons while in the vicinity of the Work.
2. Workers engaged in or near the Work during abrasive blasting shall wear eye and face protection devices, and air purifying half mask or mouthpiece respirator with appropriate filter.
3. Furnish protective clothing, gloves and barrier creams in accordance with the coating manufacturer's recommendations to prevent injury to workmen from strong chemicals during their application.

PART 2 PRODUCTS

2.01 PAINT MANUFACTURERS

- A. Where noted, the following finish paint manufacturers produce the paint types specified.
 1. Benjamin Moore and Co., 51 Chestnut Ridge Rd., Montvale, NJ 07645, (201) 573-9600.
 2. ICI Dulux Paints, 4000 Dupont Cr., Louisville, KY 40207, (800) 984-5444.
 3. PPG Architectural Finishes, One PPG Plaza, Pittsburgh, PA 15272, (800) 441-9695.
 4. Sherwin-Williams Co., Cleveland, OH 44101; 1-800-321-8194.
 5. Carboline Co., St. Louis MO. 63146; 1-800-848-4645

2.02 MISCELLANEOUS PRODUCTS

- A. Cleaning Solvents: Low toxicity with flash point in excess of 100 degrees F.
- B. Color Pigments: Pure, non-fading, finely ground pigments with at least 99 percent passing a 325 mesh sieve.
 1. Use lime-proof color pigments on masonry, concrete and plaster.
 2. Use exterior pigments in exterior paints.
- C. Bedding Compound: Water based pre-mixed gypsum wallboard joint compound
- D. Masking Tape: Removable paper or fiber tape, self-adhesive and nonstaining.
- E. Metal Filler: Polyester resin base autobody filler.
- F. Mineral Spirits: Low odor type recommended by finish paint manufacturer.
- G. Paint Stripper: As recommended by finish paint manufacturer.
- H. Stain Blocker, Primer-Sealer: As recommended by finish paint manufacturer.
- I. Turpentine: ASTM D 13.

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- J. Spackling Compound: Water based pre-mixed plaster and gypsum wallboard finishing compound.

2.03 FINISH PAINT TYPES

- A. Physical Properties:
1. Specified percent solids by weight and volume, pigment by weight, wet and dry film thickness per coat, and weight per gallon are minimum physical properties of acceptable materials.
 - a. Opaque Pigmented Paints: Physical properties specified are for white titanium dioxide base before color pigments are added.
 - b. Specified minimum wet and dry film thickness per coat are for determining acceptable finish paint products. Minimum wet and dry film thickness per coat to be applied shall comply with approved finish paint manufacturer's product data sheets.
 2. Gloss or Reflectance: The following ASTM D 523 specified light levels and angles of reflectance:
 - a. Semi-gloss: Between 30 and 65 at 60 degrees.
 - b. Gloss: Over 65 at 60 degrees.
- B. Exterior Finish Paint Types (Doors and Frames):
1. Paint Type GXL (Gloss Exterior Latex): Exterior Acrylic Latex, Gloss Enamel.
 - a. Solids by Weight: 40.0 percent.
 - b. Solids by Volume: 32.0 percent.
 - c. Solvent: Water.
 - d. Vehicle: 100 percent acrylic resin.
 - e. Weight Per Gallon: 10.0 lbs.
 - f. Wet Film Thickness: 3.4 mils.
 - g. Dry Film Thickness: 1.2 mils.
 - h. Manufacturers: Benjamin Moore, PPG, Sherwin- Williams, Carboline.
- C. Interior Finish Paint Types (Walls):
1. Paint Type SGIL (Semi-gloss Interior Latex): Interior Acrylic Latex, Semi-gloss Enamel.
 - a. Solids by Weight: 49.0 percent.
 - b. Solids by Volume: 35.0 percent.
 - c. Solvent: Water.
 - d. Vehicle: Vinyl acrylic resin.
 - e. Weight Per Gallon: 10.0 lbs.
 - f. Wet Film Thickness: 3.8 mils.
 - g. Dry Film Thickness: 1.2 mils.
 - h. Manufacturers: Benjamin Moore, ICI Dulux, Sherwin-Williams Carboline
- D. Colors: Provide paint colors shown on contract drawings or to be selected by the Director from finish paint manufacturers available color selections.
1. Approved finish paint manufacturers to match designated colors of other manufacturers where colors are shown on contract documents.

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2.04 COATING SYSTEMS

A. Coating systems described below are to be used for concrete and masonry filler, and all structural steel priming and finish coats.

B. Type C-1 System: Block/Concrete Filler, Acrylic Intermediate and Finish Coats as follows:

1. Filler: Acrylic resin designed for use on exterior and interior cast-in-place or precast concrete surfaces, 60 percent solids by volume.
2. Intermediate and Finish Coats: Water reducible, 100 percent acrylic, 38 percent solids by volume.
3. Acceptable Coating System: Heavy Duty Block Filler B42 W46, DTM Acrylic Intermediate and Finish Coating B66-200 by The Sherwin-Williams Company

C. Type C-2 System: Structural Steel Primer and Finish Coat - Self Priming, two component polyamide epoxy, 86% solids by volume.

1. Acceptable Coating system: Carbomastic 94 Self-Priming and Finish Coating by Carboline Company. SSPC SP2 and SP3 are acceptable preparation methods for the above system.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine surfaces to be prepared, primed, or painted for compliance with contract documents, required environmental conditions, manufacturer's product data sheets, product label instructions and other written requirements.

1. Do not begin any phase of the work without first checking and verifying that surfaces and environmental conditions are acceptable for such work and that any earlier phase deficiencies and discrepancies have been properly corrected.
 - a. The commencement of new work shall be interpreted to mean acceptance of surfaces to be affected.

3.02 PREPARATION

A. Protection: Cover and protect surfaces to be painted, adjacent surfaces not to be painted, and removed furnishings and equipment from existing paint removals, airborne sanding particles, cleaning fluids and paint spills using suitable drop cloths, barriers and other protective devices.

1. Adjacent exterior surface protections include roofs, walls, landscaping, driveways and walkways. Interior protections include floors, walls, furniture, furnishings and electronic equipment.
2. Remove and replace removable hardware, lighting fixtures, telephone equipment, and other devices and cover plates over concealed openings in substrates to be painted.

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- a. Cover and neatly mask permanently installed hardware, lighting fixtures, cover plates and other devices which cannot be removed and are not scheduled for painting.
 3. Schedule and coordinate surface preparations so as not to interfere with work of other trades or allow airborne sanding dust particle to fall on freshly painted surfaces.
 4. Provide adequate natural or mechanical ventilation to allow surfaces to be prepared and painted in accordance with product manufacturer's instructions and applicable regulations.
 5. Provide and maintain "Wet Paint" signs, temporary barriers and other protective devices necessary to protect prepared and freshly painted surfaces from damages until Work has been accepted.
- B. Clean and prepare surfaces to be painted in accordance with specifications, paint manufacturer's approved product data sheets and printed label instructions. In the event of conflicting instructions or directions, the more stringent requirements shall apply.
1. Cleaners: Use only approved products manufactured or recommended by finish paint manufacturer. Unless otherwise recommended by cleaner manufacturer, thoroughly rinse with clean water to remove surface contaminants and cleaner residue.
- C. Surfaces:
1. Existing Painted Substrates: Thoroughly clean to remove dirt, soot, grease, mildew, chalkiness and stains using finish paint manufacturer's recommended cleaners.
 - a. Remove loose, peeling, cracked and blistered paint by chipping, scraping, and sanding smooth with medium and fine sandpaper
 - b. Fill surface holes and depressions with finish paint manufacturer's recommended filler and sand smooth to adjacent undisturbed edges.
 - c. Touch-up bare spots on previously painted surfaces with finish paint manufacturer's recommended primer.
 - d. Sand existing semi-gloss and gloss paint surfaces to a uniform smooth dull finish before painting.
 - e. Fill and sand smooth existing paint surface damages, depressions, ridges and other imperfections that will remain visible after new paints have been applied.
 2. Steel Doors and Frames: Fill indentations and cracks with metal filler; sand smooth to match adjacent undamaged surfaces
 3. Steel Substrates:
 - a. Prepare steel in accordance with Structural Steel Painting Council (SSPC) standards:
 - 1) SSPC-SP1: Remove oil, grease, dirt, soil, salts, and other surface contaminants using appropriate cleaning solvents and clean rags, vapor, alkali, emulsion, or steam and adequate ventilation.

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- 2) SSPC-SP2: Remove loose rust, mill scale, and paint to the degree specified by hand chipping, scraping, sanding, and wire-brushing.
 - 3) SSPC-SP3: Remove loose rust, mill scale, and paint to the degree specified by power-tool chipping, descaling, sanding, wire-brushing, and grinding.
 - 4) SSPC-SP5: Remove all visible rust, mill scale, paint, and foreign matter by white-metal blast cleaning with wheel or nozzle (dry or wet) using sand, grit, or shot.
 - 5) SSPC-SP6: Remove all visible rust, mill scale, paint, and foreign matter by commercial blast cleaning until at least two-thirds of each element of the surface is free of all visible residues.
 - 6) SSPC-SP10: Near white blast cleaning for heat resistant paints.
4. Galvanized Metal:
 - a. Allow new galvanized surfaces to weather as long as possible before cleaning. Remove surface contaminants using clean rags and petroleum spirits.
 - b. Remove "white rust" using appropriate solvent and, if necessary, wire brushing or sanding.
 - c. Use appropriate Structural Steel Painting Council Standard SSPC-SP1 to SSPC-SP6 to prepare steel substrates where galvanized protection has been removed.
 5. Gypsum Wallboard:
 - a. Fill cracks, holes, and other indentations smooth to adjacent surfaces using specified bedding, spackling, and finishing compounds.
 - b. Gypsum Wallboard: Fill and sand smooth minor bedding and finishing compound defects.
 - c. Vacuum and wipe surfaces free of all sanding residue and dust.
 6. Other Substrates: See finish paint manufacturer's recommendations.
- D. Painting Material Preparations:
1. Prepare painting materials in accordance with manufacturer's approved product data sheets and printed label instructions.
 - a. Stir materials before and during application for a consistent mixture of density. Remove container surface paint films before stirring and mixing.
 - b. Slightly tint first opaque finish coat where primer and finish coats are the same color.
 - c. Do not thin paints unless allowed and directed to do so in writing within limits stated on approved product data sheets.

3.03 PAINTING SCHEDULE

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- A. Interior Walls: Unless otherwise specified, apply the following paint types with manufacturer's recommended primers on the following interior substrates:
 - 1. Paint Type SGIL (Semi-Gloss Interior Latex): See Room Finish Schedule for all locations.
- B. Doors and Frames: Unless otherwise specified, apply the following paint types with manufacturer's recommended primers on the following substrates:
 - 1. Paint Type GXL (Gloss Exterior Latex): See Room Finish Schedule for all door and frame locations
- C. Existing Structural Steel: Unless otherwise specified, apply the following paint types with manufacturer's recommended primers on the following substrates:
 - 1. Coating System C-2: All deteriorating interior and exterior structural steel shall receive this coating system

3.04 APPLICATION

- A. Environmental Conditions:
 - 1. Water-based Paints: Apply when surface temperatures will be 50 degrees Fahrenheit to 90 degrees Fahrenheit throughout the drying period.
 - 2. Other Paints: Apply when surface temperatures will be 45 degrees Fahrenheit to 95 degrees Fahrenheit throughout the drying period.
 - 3. Apply exterior paints during daylight hours free from rain, snow, fog and mist when ambient air conditions are more than 5 degrees above the surface dew point temperature and relative humidity less than 85 percent.
 - a. When exterior painting is allowed or required during noonday light hours, provide portable outdoor weather recording station with constant printout showing hourly to diurnal air temperature, humidity, and dew point temperature.
 - 4. Exterior Cold Weather Protection: Provide heated enclosures necessary to maintain specified temperature and relative humidity conditions during paint application and drying periods.
- B. Application: Apply approved paints where specified, or shown on the drawings, and to match approved field examples.
 - 1. Applicators: Brushes, rollers or spray equipment recommended by the paint manufacturer and appropriate for the location and surface area to be painted.
 - a. Approved minimum wet and dry film thicknesses for each coat shall be as recommended on approved product data sheets and the same for each application method and substrate.
- C. Paint Type Coats To Be Applied: Unless otherwise specified, or recommended by finish paint manufacturer's product data sheet and approved by submittal, the number of coats to be applied for each paint type are as follows:
 - 1. Acrylic Latex Paint Types GXL and SGIL:
 - a. New Unpainted Surfaces: Apply 1 coat of primer and 2 coats of finish paint.
 - b. Existing Painted Surfaces:

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- 1) Apply 2 coats of finish paint when existing paint has a lower gloss.
 - 2) Apply one coat of primer and 2 finish coats when existing paint has a higher gloss.
 - c. Paint Type SGIL: Provide mildewcide additive for bathrooms, kitchens, janitor closets, laundry rooms, restrooms and other wet or damp areas.
2. Block Filler, Steel Primer, Steel Finish Coats
Pitted Concrete & Concrete Masonry Surfaces: Use block filler as primer /sealer where allowed by finish paint manufacturer.
 - e. Existing Structural Steel:
 - 1) Primed Steel: Apply 2 coats of finish paint.
 - 2) Unprimed Steel: Apply 1 coat of Paint Type ESP or ISP, depending upon exterior or interior location.
 - a) If top coated, apply additional coat of finish paint manufacturer's galvanized primer and 2 coats of finish paint.
3. Other Paint Types: Apply in accordance with paint manufacturer's product data sheets.

3.05 ADJUSTING AND CLEANING

- A. Reinstall removed items after painting has been completed.
 1. Restore damaged items to a condition equal to or better than when removed. Replace damaged items that cannot be restored.
- B. Touch up and restore damaged finish paints. Touch up and restoration paint coats are in addition to the number of specified finish paint coats.
- C. Remove spilled, splashed, or spattered paint without marring, staining or damaging the surface. Restore damaged surfaces to the satisfaction of the Director's representative.
- D. Remove temporary barriers, masking tape, and other protective coverings upon completion of painting, cleaning and restoration work.

END OF SECTION

SECTION 09910
PIPE AND EQUIPMENT PAINTING

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included

1. Furnish all painting materials and equipment and perform all labor necessary to provide a finished and completely acceptable painting/finishing job for the pipe and mechanical equipment.
2. Conduct work in accordance with all applicable regulations (e.g., OSHA).
3. Remove and dispose of all materials resulting from the work in accordance with all applicable regulations.
4. Provide markers, labels, tags, and signs for pipe and equipment.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. See all Equipment and Piping Specifications

1.3 QUALITY ASSURANCE

A. All painting materials shall remain in their original containers with manufacturers' label intact.

The following information shall appear on all painting material labels:

1. Manufacturer's name
2. Product name and number
3. Color
4. Batch number

B. All painting work shall be done in strict accordance with the paint manufacturer's published instructions in concert with this section of the specifications. Where manufacturer's recommended materials, surface preparation, number of coats or mil thicknesses exceed those shown in the specifications, the recommendations of the manufacturer shall govern.

C. Field Quality Control

Field painting shall be performed by an approved painting subcontractor. Applicator shall be trained in application techniques and procedures of coating materials and shall demonstrate a minimum of 5 years successful experience in such applications as an industrial coatings applicator.

D. Maintain throughout the duration of the application a crew of painters that are fully qualified.

E. The Contractor shall coordinate the paint products to be used such that shop and field coats are compatible. The Contractor shall coordinate the use of coatings such that shop coatings and field coatings are supplied by the same manufacturer, and that shop and field coats are compatible.

F. The Contractor will warranty his workmanship for a period of one year from the date of completion. The Contractor will supply labor and material at no cost to the owner for the repair / touchup of any area where the newly applied coating has flaked or peeled.

G. The painting contractor must monitor the daily activities associated with the application of all materials. Accordingly, the Contractor will keep a daily log recording the following:

1. Ambient conditions (relative humidity and dew point)
2. Substrate temperatures
3. Batch numbers of materials
4. Mixing data-thinning
5. Dry film thickness readings for each coat applied (before & after).

H. Reference Standards

1. American Society for Testing and Materials
 - a. ASTM D 2246, Freeze-Thaw Test
 - b. ASTM D 2247, Humidity Test
 - c. ASTM B 117, Salt Spray Test
 - d. ASTM E 84, Surface Burning Characteristics Test

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- e. ASTM D 16 Terminology relating to Paint, Varnish, Lacquer, and Related Products
- f. ASTM D 1005 Test for determining dry film thickness
- 2. Federal Specification
 - a. TT-C-555B, Section 4.4.7 Wind Driven Rain Test
- 3. Steel Structures Painting Council
 - a. Steel Structures Painting Manual, Volume 11, Systems & Specifications
- 4. The Society for Protective Coatings:
 - a. SSPC-SP-1 Solvent Cleaning
 - b. SSPC-SP-2 Hand Tool Cleaning
 - c. SSPC-SP-3 Power Tool Cleaning

1.4 SUBMITTALS

- A. The following items shall be submitted to the Engineer in accordance with the General Provisions:
 - 1. Paint Schedule - A comprehensive and complete schedule of surface preparations and paint systems shall be submitted. This schedule shall list all interior and exterior surfaces and all major equipment and piping to be painted by room, area or location. The schedule shall reflect the paint manufacturer's recommendations for the coating systems and shall contain certification that the manufacturer's representative has reviewed and approved the schedule. For each room or area to be painted the schedule shall present the following information in neat and tabular form:
 - a. Location, room or area name (e.g., Blower Room, Primary Sludge Pump Room, etc.)
 - b. All surfaces or items to be painted (e.g., pump, sludge discharge piping, etc.).
 - c. Paint system identification per section 3.08 below
 - d. Color for prime, intermediate and finish coats for all surfaces or items to be painted including manufacturers' alphanumeric code and generic name (e.g., AY 82 Arctic Ice).
 - e. Notes, remarks or comments on any proposed deviations, special conditions, treatment or application requirements.
 - f. Painting status at time of installation (e.g., bare steel, primed, etc.)
 - g. The schedule shall also contain the name of the paint manufacturer and information on the manufacturer's representative who will coordinate and/or inspect the work including name, address and telephone number. The schedule shall be submitted as soon as possible following the award of the contract so that the approved schedule may be used to identify colors and to specify shop paint systems for fabricated equipment.
 - h. Colors – for pipe and banding, as required – shall be as noted in the Piping Color and Label Schedule (Section 3.7) or other sections in this specification subject to final selection by the Engineer during review of submittals.
 - i. Colors for building areas, equipment, etc. will be selected by the Engineer during review of the paint schedule. The Contractor shall submit chips with the paint schedule to aid in color selection. Color names and/or numbers will be identified according to the appropriate color chart issued by the manufacturer of the respective product.
 - 2. Manufacturer's technical data sheets for each paint/coating giving descriptive data, curing time, mixing, thinning and application instructions.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in sealed containers with manufacturer's label intact.
- B. Storage of Material
 - 1. Store materials in a protective area at a temperature between 40°F and 110°F, unless otherwise required by the product manufacturer.

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1.6 JOB CONDITIONS

- A. Apply coatings only under the following prevailing environmental conditions:
 - 1. Air and surface temperature are not below 50°F or above 110°F. Refer to specific product data sheets for minimum surface temperature requirements. Surface temperature shall be at least 5 degrees F above dew point and in a rising mode.
 - 2. Relative humidity is not greater than 85% and the surface temperature is at least 50°F above the dew point.
 - 3. The atmosphere is relatively free of airborne dust.
 - 4. Or as otherwise required by product manufacturers.

1.7 Safety and Health Requirements

- A. In accordance with requirements set forth by regulatory agencies applicable to the construction industry and the manufacturer's printed data sheets and appropriate technical bulletins and manuals, the Contractor shall instruct his employees in the proper use of all materials and protect his employees as required by OSHA.
- B. Head, face, eye, and ear protection will be provided by the Contractor to his employees. Barrier creams shall be used to protect the workers skin.
- C. All ladders and scaffolding must conform to the applicable safety requirements of OSHA.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Unless otherwise specified materials shall be products of the following manufacturer/supplier or equal:
 - 1. Tnemec Company, Inc. (paints and coating systems)
 - 2. Carboline
 - 3. Approved Equal

PART 3 EXECUTION

3.1 GENERAL PAINTING NOTES

- A. All coatings specified herein for new equipment and materials are in addition to shop coating specified elsewhere.
- B. Apply coatings with brush or roller, spray paint only with Engineer's approval.
- C. Coatings shall be free from imperfections; unacceptable work will be given additional coats, if required, at no additional costs to the Owner.
- D. The Contractor shall provide all scaffolding, staging, etc., required to perform his work. Place scaffolding to avoid interference with others.
- E. Damaged shop coatings shall be cleaned and retouched before any successive field painting is done.
- F. Shop primers shall be compatible with finish coats specified.
- G. New Caulking shall not be painted.
- H. Application of field coating(s) to prepared surface/substrate will constitute Contractor's acceptance of surface/substitute.
- I. In areas scheduled to be finished, electrical conduit and miscellaneous piping, including piping by other Contracts, shall be painted to match adjacent ceilings and walls unless otherwise required by this specification or allowed by the Owner.
- J. Painted surfaces shall be fully finished and cured prior to installation of insulating materials or signs.

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PIPE AND EQUIPMENT PAINTING

- K. Protection: The painting contractor must take the necessary precautions to protect the equipment / fixtures adjacent to the work area, which are not scheduled for painting.

3.2 SANDBLASTING

- A. Sandblasting shall conform to the Steel Structures Painting Council's System and Specifications.
- B. Proportions of sand, grit or shot shall be adjusted as necessary to produce a prepared surface equivalent of the approved sample.
- C. Application of protective coatings shall be within 24 hours after blast cleaning.
Surfaces showing any traces of rust shall be blasted again before application of protective coatings.
- D. In areas where assemblies are scheduled to receive a sandblasted surface preparation and portions of the assembly have been previously coated, all prior coatings shall be removed by blast cleaning to the extent necessary for proper adhesion of the specified coating.
- E. Work, including but not limited to sandblasting, painting, and disposal of work materials, shall be performed in accordance with all applicable regulations (e.g., OSHA 20 CFR 1926.62).

3.3 APPLICATION

- A. Mix and thin materials in accordance with the manufacturer's printed instructions.
- B. Apply materials at specified thickness by method recommended by the manufacturer.
- C. Allow each coat to dry thoroughly before recoating.
- D. Vary color slightly to indicate each successive coating.
- E. Cut in edges clean and sharp where work joins other materials or colors.
- F. Make finish coats smooth, uniform in color and free of brush marks, laps, runs and missed areas.

3.4 INSPECTION

- A. Surface Cleanliness: Surface of abrasive blast-cleaned steel shall comply with the SSPC pictorial standards.
- B. Surface Profile: The surface profile for ferrous metal scheduled to receive protective coatings shall be between 20 and 30% of the total dry film thickness for the completed system.

3.5 CLEANING

- A. Remove paint spatters from finished areas.
- B. Repair any damage to coatings or surfaces caused by cleaning operation.
- C. Remove debris from job site and leave storage area clean.

3.6 SYSTEMS FOR PAINTING AND FINISHING

A. General

- 3. System C – Applicable for Exterior Structural Steel and Miscellaneous Metal, and Bollards.
Surface Preparation: SSPC-SP6 Commercial blast cleaning.
Prime Coat: Tnemec Series 90-97 Zinc (shop Applied) 2.5-3.5 mils DFT. Tnemec 901K97 is used for field touch-up.
Intermediate Coat: Tnemec Series N69 Epoxoline @ 3.0-5.0 mils DFT.
Finish Coat: Tnemec Series 1075U – (color) Endura Shield @ 2.0-3.0 mils DFT.
- 6. System F – Applicable for New Interior Miscellaneous Metal and Structural Steel, Pumps and Motors, Ductile Iron and Steel Piping, Valves and Non-Stainless Steel Ferrous Appurtenances.
Surface Preparation: SSPC-SP6 Commercial blast cleaning (if item not subject to immersion). SSPC-SP10 Near White Blast (if item is subject to immersion).
Prime Coat: Tnemec Series 1 Primer (shop Applied) @ 2.0-3.0 Mil DFT.
Intermediate Coat: Tnemec Series N69 (color) @ 4.0-5.0 mils DFT.
Finish Coat: Tnemec Series N69 (color) @ 4.0-6.0 mils DFT.

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3.7 PIPING COLOR AND LABEL SCHEDULE

- A. All piping painting, banding and labeling shall be in accordance with the “Recommended Standards for Wastewater Facilities,” published by the Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers. The following labels and colors shall be used, as applicable:

<u>Piping Type and Label</u>	<u>Color</u>
Raw Sludge	Brown with Black Band
Sludge Recirculation Suction	Brown with Yellow Bands
Sludge Draw Off	Brown with Orange Bands
Sludge Recirculation Discharge	Brown
Sludge Gas	Orange
Natural Gas	Orange with Black Bands
Non-Potable Water	Blue with Black Bands
Potable Water	Blue
Chlorine	Yellow
Sulfur Dioxide	Yellow with Red Bands
Sewage	Gray
Compressed Air	Green
Fuel Oil/Diesel	Red
Plumbing Drain/Vent	Black
Polymer	Purple

B. WASTE MANAGEMENT

1. General Requirements:
 - a. Place materials defined as hazardous in designated containers.
 - b. Return solvent and oil soaked rags for contaminant recovery and laundering or for proper disposal.
 - c. Do not dispose of paints or solvents by pouring on ground. Place in designated containers for proper disposal per State and Federal regulations. A copy of the shipping manifest shall be provided to the Engineer.

END OF SECTION

SECTION 11130
DRY PIT NON-CLOG PUMPS

1.01 SUMMARY

- A. The CONTRACTOR shall furnish all labor, material, tools, supervision, transportation and installation equipment to furnish and install four (4) fully operational vertical dry pit submersible wastewater pumps, and two (2) storm flow pumps as specified herein and shown on the Drawings.
 - a. The four Effluent Pumps discharge to two (2) 12-inch force mains
 - b. The two Storm Pumps discharge to the EQ Tank

1.02 SUBMITTALS

- A. Shop Drawings -Supplier shall submit six (6) sets of shop drawings. Shop drawings shall include equipment descriptions, specifications, dimensional and assembly drawings, a rotating equipment analysis, parts lists, and job specific drawings.
- B. Multiple speed curves showing the pump operating range shall also be submitted.
- C. Operation and Maintenance Manuals - Supplier shall submit three (3) sets of Operation and Maintenance manuals. The manuals shall include equipment descriptions, operating instructions, drawings, troubleshooting techniques, a recommended maintenance schedule, and the recommended lubricants.

1.03 QUALITY ASSURANCE

- A. Qualifications of Manufacturers: The pumps shown and specified are based on the products manufactured by Sulzer Pumps. Catalog numbers and references are given only as an indication of the quality of materials and workmanship to be used. Pumps are to be engineered and manufactured under a written Quality Assurance program. The Quality Assurance program is to have been in effect for at least five (5) years and shall include a written record of periodic internal and external audits to confirm compliance with such program.

The Dry Pit Pumping Units shall conform to all applicable requirements of ASTM, ANSI and Hydraulic Institute. For purposes of this specification, the revision and/or version of the referenced standards in effect on the date of public bid opening shall apply.

The Dry Pit Pumping Units specified shall be the products of reputable manufacturers who have been regularly engaged in the design, manufacture and furnishing of Wastewater Pumping Equipment for at least ten (10) years. The manufacturer of the pump shall assume full responsibility compatibility of the supplied components with the application.

- B. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified:
 - 1. American Society of Testing and Materials (ASTM)
 - 2. National Electric Code (NEC)
 - 3. Standards of National Electrical Manufacturing Association (NEMA)
 - 4. American National Standards Institute (ANSI)

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- 5. Standards of Hydraulic Institute
 - 6. Factory Mutual (FM)
- C. Supplier shall provide the services of a factory-trained representative to check the installation and to start-up each pump. The factory representative shall have complete knowledge of proper installation, operation, and maintenance of equipment supplied. Representative shall inspect the final installation and supervise a start-up test of the equipment.
- D. TESTING:

The natural frequency of the assembled pump and its supporting structure shall be at least 25 percent higher than the maximum pump excitation frequency. The pump shall operate within the vibration limits of the Hydraulic Institute

The pumps shall be performance tested at the manufacturer's plant before shipment in accordance with Hydraulic Institute standards. Upon request, certified copies of the test curves shall be submitted to the engineer.

Each pump shall be hydrostatically tested at the manufacturer's plant before shipment in accordance with Hydraulic Institute standards. Upon request, certified copies of the test results shall be submitted to the engineer.

1.04 DELIVERY, STORAGE AND HANDLING

- A. The equipment shall be packaged in containers constructed for normal shipping, handling and storage.
- B. The containers shall provide adequate protection for the equipment in a dry indoor environment between +40°F (+4.5°C) and +100°F (+37.8°C) until time for installation.

1.06 IDENTIFICATION

- A. Each unit of equipment shall be identified with a corrosion resistant nameplate, securely affixed in a conspicuous place. Nameplate information shall include equipment model number, serial number, supplier's name, and location.

PART 2 - PRODUCT SELECTION

2.01 ACCEPTABLE MANUFACTURERS

- A. The physical layout of the pumps as shown on the contract drawings and the equipment specified herein are based upon Sulzer. The use of this pump does not remove any responsibility of the CONTRACTOR to verify dimensions and elevations to ensure the equipment will fit within the proposed building and equipment configurations. The use of an "or equal" system will require the manufacturer to provide a modified layout subject to the approval of the ENGINEER at no additional cost the OWNER. The pump shall be in compliance with these specifications and plans and shall be one of the following manufacturer models:

- 1. Sulzer Model XFP 105J-CB2

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2. Pre-approved equal (*Contractor shall note that any equal shall be pre-approved a minimum of 1 week prior to the bid opening date as listed in the invitation to bid. The contractor shall further note that any pre-approval will be distributed via an addendum. The contractor is cautioned that any perceived verbal approval does not constitute a pre-approval.*)

All six (6) pumps provided shall be the same manufacturer with appropriate motor as noted in 2.02.B.

- D. If the CONTRACTOR proposes an “or equal” system, it shall be understood that the proposed pump meets or exceeds the specified performance and construction and offers a cost savings to the OWNER. The CONTRACTOR may be responsible for engineering time to review proposed substitutions.
- E The CONTRACTOR shall note that not all recommended suction and wet well conditions in the Hydraulic Institute Standards are able to be met as it is an existing facility. The manufacturer shall take this into account, refer to the Contract Documents, and design the pump to withstand any added unbalanced loading or adverse reactions due the existing configuration.

2.02 OPERATING SELECTION

- A. The pump shall be designed for continuous operation and operate at/or below vibration levels listed in the Hydraulic Institute standards, Latest Edition. The pump shall be designed to operate continuously for an extended period of time at any point in the specified operating range of the curve without cavitation, overheating or excessive vibration. The motor nameplate horsepower rating shall not be exceeded by the pump brake horsepower required.
- B. Design Conditions: All pumps must meet the maximum and minimum allowable conditions below, including all points in between.

Effluent Pumps

Design Criteria –Total of four (4) pumps.

- 1. Liquid Pumped – Wastewater
- 2. Motor Speed (Max) – 1,800 rpm
- 3. Suction size – 6 inches
- 4. Discharge size – 4 inches
- 5. Power Requirements – 460 Volt, 3 Phase, 60 Hz
- 6. Drive Type – VFD
- 7. Motor shall be a premium efficient inverter duty motor
- 8. Number of Pumps: 4
- 9. Motor Horsepower – 70 HP
- 10. Max. Shutoff head: 165'
- 11. Pump Duty Point 1: 700 GPM @ 137' TDH (each pump with 2 pumps running at max speed). Pump efficiency @ 65%
- 12. Pump Duty Point 2: 1180 GPM @ 113' TDH (with 1 pump running max speed). Pump efficiency @ 65%
- 13. Approved Pump – Sulzer/ABS XFP 105J-CB2

Storm Pumps

Design Criteria –Total of two (2) pumps.

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1. Liquid Pumped – Wastewater
2. Motor Speed (Max) – 1,800 rpm
3. Suction size – 6 inches
4. Discharge size – 4 inches
5. Power Requirements – 460 Volt, 3 Phase, 60 Hz
6. Drive Type – VFD
7. Motor shall be a premium efficient inverter duty motor
8. Number of Pumps: 2
9. Motor Horsepower – 70 HP
10. Max. Shutoff head: 165'
11. Pump Duty Point 1: 900 GPM @ 26' TDH (with 1 pump running at 50% speed).
Pump efficiency @ 30%
12. Approved Pump – Sulzer/ABS XFP 105J-CB2

2.03 ROTATING EQUIPMENT AND FREQUENCY ANALYSIS

- A. The complete pumping system including pump, motor, shafts, couplings and all appurtenances shall have no critical or resonant frequencies or multiples of resonant frequencies within the specified operating range of the pump. This range shall be from pump minimum to pump maximum operating speed. The system shall have no visible vibration during start-up, operation or shutdown. Any critical or resonant frequencies or vibrations shall be corrected by the pump manufacturer at no cost additional cost to the Owner.

The pump manufacturer shall conduct the FEA (Finite Element Analysis) prior to building the pump in order to predict potential resonance with all excitation sources. The analysis shall be conducted across the entire operating range of the pump and certified by a licensed professional engineer regularly engaged in this type of work. The certified FEA shall be provided with the pump submittal.

2.04 CASING

The casing shall be designed for handling raw sewage and shall be of cast iron conforming to ASTM A48, Class 30 or better, of sufficient thickness and suitably ribbed to withstand all stresses and strains of service at full operating pressure.

The volute shall be side-flanged, tangential discharge and designed to be installed at positions of 45 degree increments. A hand hole shall be provided in the casing to provide convenient access to the impeller and interior parts of the pump. The inner contours of the handhole cover shall match the contours of the casing. No stationary guides or splitters will be permitted on either the suction or discharge sides of the casing. The casing shall be provided with tapped and plugged (removable) vent, drain, and gauge connections. The discharge connection shall be 125 lb. standard raised face flange positioned as indicated on the Drawings.

2.05 IMPELLER

The impeller shall be balanced solids-handling type made of close-grained cast iron conforming to ASTM A48 Class 30 or better. The impeller shall be single suction, enclosed, two to four vane, radial flow design with well rounded leading vanes and then tapered toward the trailing edge for a circular flow pattern. The waterways through the impeller shall have extremely smooth contours, devoid of sharp corners, so as to prevent rags or stringy, fibrous material from catching or

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clogging. Wiper vanes are required on the back shroud of the impeller to minimize end thrust and reduce pressure on the stuffing box. The Impeller shall include 3% nickel for hardness and abrasion resistance.

The impeller shall be cast in one piece and shall be dynamically balanced. Rotation of the impeller shall correspond to the pump discharge orientation as indicated on the Drawings. The design of the impeller and the shape of the blades shall be such that rags or similar materials will not clog the pump or seriously affect the efficiency. The impeller shall be keyed to the shaft and firmly held in place by a streamlined 316 stainless steel or bronze locking device. The arrangement shall be such that the impeller cannot be loosened by torque from either forward or reverse rotation.

2.06 WEAR RINGS

Removable hardened stainless steel wear rings shall be provided for both the suction cover and the impeller, with the wearing surfaces normal to the axis of rotation. They shall be securely fastened with counter-sunk, machine-head, stainless steel screws to prevent any relative motions and designed for easy replacement. Both wear rings shall be a minimum of 3/8 inch thick and shall be made of hardened 400 series stainless steel, with the impeller ring hardened to 325 to 375 Brinell and the casing ring hardened to 425 to 475 Brinell and designed to compensate for a minimum of one-quarter inch wear.

2.07 STUFFING BOX

The stuffing box shall be readily accessible and its construction shall permit the use of either a or teflon seal ring and packing without special machining. The stuffing box shall be designed for a minimum of five (5) rings of packing in addition to a seal ring and suitable for use of clean water for sealing. The stuffing box shall be provided with a split removable cast iron (bronze) gland to facilitate packing replacement. The seal ring shall be located adjacent to and on the outboard side of the second packing ring. The stuffing box shall be drilled and tapped for a 1/4 inch minimum water seal connection. The seal ring shall be a split ring, 25 percent glass filled TFE type, of sufficient strength for the intended service, drilled and tapped for easy removal, and suitably positioned to assure uniform distribution of the sealing medium. The top of the pump casing cover shall be provided with a lip suitable for use as a reservoir to retain stuffing box leakage and a 1/2 inch minimum NPT tapped hole to permit leakage to be drained away. A mechanical seal will only be allowed if the Cornell model is provided. The seal water system is to still be installed as a flushing system for the mechanical seal technology.

2.08 PUMP SHAFT

The pump shaft shall be made from high grade heat treated alloy steel, rigid shaft type, of sufficient size to transmit the full driver horsepower with a liberal safety factor, accurately machined over its entire length and free from any harmful or damaging vibrations. The pump shaft shall include a tapered end for positive alignment and ease of removal at the impeller hub. Shaft deflection shall not exceed .002 inch at the stuffing box at $\pm 40\%$ of the best efficiency point of the impeller curve furnished. A renewable stainless steel shaft sleeve shall be provided extending from the impeller hub through the stuffing box. The shaft sleeve shall be internally ground and positively secured to the shaft to prevent relative rotation. Passage of water between

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the shaft and sleeve shall be prevented by O-ring or other approved means. Shrink fit shaft sleeves will not be acceptable. The shaft sleeve shall be hardened 400 series stainless steel with a 425 to 475 Brinell hardness and a 32 micro-inch surface finish.

2.09 PUMP BEARINGS

The pump shall be provided with radial and thrust anti-friction ball or tapered-spherical roller type bearings of ample size to carry all loads imposed under continuous operation without overheating. The bearings shall be grease lubricated and a relief port lip seal shall be provided so that excessive grease pressure will not damage the bearings. The pump bearing frame shall be designed so that the complete rotating element can be removed from the pump casing without disconnecting of the suction or discharge piping. The bearings shall be designed in accordance with AFBMA standards for a minimum

L-10 life of 40,000 hours at the most extreme operating points on the pump performance curve and a minimum of 100,000 hours at the primary duty point.

2.10 BEARING FRAME

The pump bearing frame shall be made of ASTM A48 Class 30 cast iron material. The bearing frame shall be shoulder fitted, accurately centered and rigidly fixed to the pump casing and backplate. The bearing frame shall contain jacking bolts and shims for the axial adjustment of the rotating element when necessary to provide the manufacturer's recommended clearance between the impeller and suction cover over the life of the pump.

2.11 SUCTION AND BACKPLATE

The suction and backplate shall be of the same material as the casing, cast separate from the volute and built to allow complete removal of the bearings, shaft and impeller without disturbing the pump suction or discharge piping connections. The suction and backplate shall be shoulder fitted to the casing and assembled with studs to assure accurate alignment. The backplate shall be designed to support the rotating assembly and shall have a convertible stuffing box of ample depth and design to accommodate either a mechanical seal or packing. The suction plate shall include a suction elbow which shall be provided with a handhole. The inner contours of the handhole cover shall match the contours of the suction elbow. The pump suction shall be of the size specified; 125 lb. standard raised face flanged and shall be provided without the use of pipe adaptors.

2.12 PUMP SUPPORT

- A. The pump support system shall be of sufficient size, strength and rigidity to support the unit and prevent harmful or damaging vibration. The fabricated steel base shall be anchored to the concrete floor/pad using a minimum of four stainless steel anchor bolts. The steel base shall be designed by the manufacturer.
- B. Reinforced concrete piers or alternative pump support systems shall be designed by a Structural P.E., retained by the Contractor, or by the pump manufacturer. Pump manufacturer shall provide

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dead and live loads to be supported. Support design shall be submitted to the Engineer for review and file prior to construction.

2.13 MOTORS AND DRIVES

- A. The motor shall be of United States manufacture, vertical mount "P" base solid shaft type with rodent screens on all ventilating passages. It shall not be more than the horse power stated herein for each pump station, exclusive of the service factor at any point on the pump head capacity curve from shutoff to run-out. Motors shall be TEFC premium efficient inverter duty 1.15 SF. Motor supply power is 460 volt, 60 hertz, 3 phase. The motors shall be equipped with grease fittings and automatic grease reliefs. Motors shall also be provided with driphood over top end bell. Motors shall be equipped automatically resetting overtemperature sensors, seal leak sensors and space heaters. Pump manufacturer shall provide relays to pump control system vendor for seal leak sensors and thermals to install in VFD cabinet.

PART 3 EXECUTION

3.1. EXAMINATION

- A. Contractor shall off-load equipment at installation site using equipment of sufficient size and design to prevent injury or damage. Immediately after off-loading, contractor shall inspect complete pump and appurtenances for shipping damage or missing parts. Any damage or discrepancy shall be noted in written claim with shipper prior to accepting delivery. Validate all pump serial numbers and parts lists with shipping documentation. Notify the manufacturer's representative of any unacceptable conditions noted with shipper.

3.2. INSTALLATION

- A. Install, level, align, and lubricate pumps as indicated on project drawings. Installation must be in accordance with written instructions supplied by the manufacture at time of delivery.
- B. Suction pipe connections are vacuum tight. Fasteners at all pipe connections must be tight. Install pipe with supports and thrust blocks to prevent strain and vibration on pump piping. Install and secure all service lines (level control, air release valve or pump drain lines) as required.
- C. Check motor and control data plates for compatibility to site voltage. Install and test the station ground prior to connecting line voltage to control panel.
- D. Prior to applying electrical power to any motors or control equipment, check all wiring for tight connection. Verify that protective devices (fuses and circuit breakers) conform to project design documents. Manually operate circuit breakers and switches to ensure operation without binding. Open all circuit breakers and disconnects before connecting utility power. Verify line voltage, phase sequence and ground before actual start-up.
- E. After all anchor bolts, piping and control connections are installed, completely fill the grout dam in the pump station base with non-shrink grout.

3.3. FIELD QUALITY CONTROL

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A. Operational Test

1. Prior to acceptance by OWNER, formal start-up and testing of all equipment and control systems shall be conducted by the CONTRACTOR, in the presence of the ENGINEER and a representative of the pump vendor, to determine if the installed equipment meets the purpose and intent of the specifications. Tests shall demonstrate that all equipment is electrically, mechanically, structurally, and otherwise acceptable; it is safe and in optimum working condition; and conforms to the specified operating characteristics.

B. Manufacturer Training

1. A representative of the of the pump supplier shall, at the successful completion of start-up provide one day of on-site training for the operators and shall demonstrate the basic operation and maintenance procedures. This training may not be conducted until such time that all start-up and testing has been successfully completed. The vendor is cautioned that these training sessions must be scheduled in advance and have prior approval to be considered completed.
2. Intermediate start-up and training shall be provided after installation of two effluent pumps.
3. Follow-up service: The manufacturer's representative shall return to the facility at the end of the Warranty period to address any operational issues which have arisen. This inspection does not eliminate the possible need for the representative to return sooner if equipment problems arise.

3.4 WARRANTY

- A. A written two year standard warranty from the date of the successful equipment start-up shall be provided by the equipment supplier to guarantee that there shall be no defects in material or workmanship in any item supplied.

3.5 SPARE PARTS

- A. The Contractor shall furnish the following spare parts in clearly identified containers for each pumping station:
- Four bearing sets
 - Four complete gasket sets
 - Four mechanical seal repair kits (for pump with mechanical seals)
 - Four packing kits (for pumps with packing)
 - Four sets of wear rings

END OF SECTION

SECTION 11330
WASTEWATER GRINDERS

1.01 SUMMARY

- A. The CONTRACTOR shall furnish all labor, material, tools, supervision, transportation and installation equipment to furnish and install two (2) wastewater grinders as specified herein and shown on the Drawings.

1.02 SUBMITTALS

- A. Shop Drawings
Supplier shall submit three (3) sets of shop drawings. Shop drawings shall include equipment descriptions, specifications, dimensional and assembly drawings, parts lists, and job specific drawings.
- B. Operation and Maintenance Manuals
Supplier shall submit three (3) sets of Operation and Maintenance manuals. The manuals shall include equipment descriptions, operating instructions, drawings, troubleshooting techniques, a recommended maintenance schedule, and the recommended lubricants.

1.03 QUALITY ASSURANCE

- A. The equipment covered in this section shall be a product of a reputable, qualified and success manufacturer who is of proven ability and has experience in the production of centrifugal pumps. Supplier shall provide a list of names and dates of installations for verification by the Engineer or Owner's Representative. All equipment proposed shall be demonstrated to the satisfaction of the Engineer, that the quality is equal to equipment made by those manufacturers specifically named herein.

The equipment specified in this section shall be furnished by and be the product of one manufacturer. The pumps, complete with motor, necessary guards, supports and all others specified accessories and appurtenances shall be furnished by the manufacturer to ensure compatibility and integrity of the individual components, and provide the specified warranty for all components.

- B. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified:
 - 1. American Society of Testing and Materials (ASTM)
 - 2. National Electric Code (NEC)
 - 3. Standards of National Electrical Manufacturing Association (NEMA)
 - 4. American National Standards Institute (ANSI)
 - 5. Standards of Hydraulic Institute
 - 6. Factory Mutual (FM)
- C. Supplier shall provide the services of a factory-trained representative to check the installation and to start-up each pump. The factory representative shall have complete knowledge of proper installation, operation, and maintenance of equipment supplied. Representative shall inspect the final installation and supervise a start-up test of the equipment.

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WASTEWATER GRINDERS

1.04 DELIVERY, STORAGE AND HANDLING

- A. The equipment shall be packaged in containers constructed for normal shipping, handling and storage.
- B. The containers shall provide adequate protection for the equipment in a dry indoor environment between +40°F (+4.5°C) and +100°F (+37.8°C) until time for installation.

1.06 IDENTIFICATION

- A. Each unit of equipment shall be identified with a corrosion resistant nameplate, securely affixed in a conspicuous place. Nameplate information shall include equipment model number, serial number, supplier's name, and location.

PART 2 - PRODUCT SELECTION

2.01 ACCEPTABLE MANUFACTURERS

- A. The physical layout of the grinders as shown on the contract drawings and the equipment specified herein are based upon JWC. The use of this manufacturer does not remove any responsibility of the CONTRACTOR to verify dimensions and elevations to ensure the equipment will fit within the proposed building and equipment configurations. The use of an "or equal" system will require the manufacturer to provide a modified layout subject to the approval of the ENGINEER at no additional cost the OWNER. The equipment shall be in compliance with these specifications and plans and shall be one of the following manufacturer models:

- 1. JWC model Channel Monster
- 2. NOV Series A Muncher
- 3. Or approved equal

All equipment provided shall be the same manufacturer and model number with appropriate motor.

- B. If the CONTRACTOR proposes an "or equal" system, it shall be understood that the proposed pump meets or exceeds the specified performance and construction and offers a cost savings to the OWNER. The CONTRACTOR may be responsible for engineering time to review proposed substitutions.

2.02 SEWAGE GRINDER:

A. General

Grinder shall reduce or shred influent solids for protection of downstream equipment. Grinder shall be two shafted design consisting of individual cutters and spacers of equal diameter on both shafts. Grinder shall have high flow or slotted side rails. Grinder shall have a motor and speed reducer for cutter drive.

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WASTEWATER GRINDERS

B. Components

1. Wipes Cutters and Spacers

- a. Cutting stack shall be a nominal height of 60 inches.
- b. Cutter shall be an individual disk constructed of AISI alloy steel surface ground to thickness of .438-inches $+.000/-0.001$ (11.1 mm $+.000/-0.003$).
- c. Wipes Cutters shall be heat treated to produce a hardness of 45-53 Rockwell C.
- d. Wipes Cutters shall have 17 cam shaped teeth. Tooth height shall not be greater than 1/2-inch (13 mm) above the root diameter of the cutter. OD shall be 4.71-inches (120 mm).
- e. Spacers shall be an individual disk constructed of AISI alloy steel surface ground to a thickness of .446-inches $+.001/-0.000$ (11.3 mm $+.003/-0.000$).
- f. Spacers shall have a hardness of 34-42 Rockwell C.
- g. Spacers shall have a knurled outside diameter with no tooth profiles.

2. Shafts

- a. Shafts shall be AISI 4140 alloy steel with a minimum tensile strength of 149,000 PSI (1,027 kPa).
- b. Shafts shall measure a nominal 2-inches (51 mm) across flats of hex.
- c. Shafts shall be hardened to 38-42 Rockwell C.

3. Intermediate Shaft Supports

- a. Intermediate shaft supports shall be ASTM A743 stainless steel, AISI 17-4 stainless steel and SAE 660 bearing bronze.
- b. Shaft supports shall be lubricated with high temperature marine grade grease at the factory.
- c. Intermediate shaft supports shall provide additional support to the shafts during severe grinding demands.
- d. Intermediate shaft supports shall be provided only for cutter stacks of 40 inches (1016 mm) and greater.

4. Seal Cartridges

- a. Seal cartridges shall be rated to a maximum of 90 PSI (620 kPa).
- b. Seal cartridges shall not require flushing.
- c. Dynamic and rotating seal faces shall be tungsten carbide with 6% nickel binder.
- d. O-rings shall be constructed of Buna-N (Nitrile).
- e. Radial and axial loads shall be borne by sealed, oversized, deep-groove ball bearings.

5. Housings and Covers

- a. Top cover and end housings shall be ASTM A536-84 ductile iron.
- b. Bottom cover shall be ASTM A36 steel.
- c. End housing shall have integral bushing deflectors to guide solids away from seal cartridges.
- d. End housings shall have directional flow arrows cast into the external side walls.

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6. Side Rails

- a. Side rails shall be ASTM A536-84 ductile iron.
- b. Side rails shall have evenly-spaced Delta P horizontal fingers to maximize flow and maximize capture of solids by the cutter stack.
- c. Clearance between cutter side rail and adjacent cutters shall not exceed 0.100" (2.54 mm).

7. Speed Reducer

- a. Reducer shall be manufactured by Sumitomo Machinery Corporation of America.
- b. Reducer shall be internal planetary mechanism with trochoidal curved tooth profile.
- c. Reducer shall be a vertically mounted with 29:1 single reduction.
- d. Reducer shall be grease lubricated.

8. Motor

- a. Motor shall be 5 hp, XPNV, 1770 rpm, 460 volt, 3 phase, 60 Hz
- b. Motor shall be U.L. rated NEMA 6P, Class I, Div. I Groups C&D, Class II Div. II, Groups F&G, Class III Div. I
- c. Motor shall have additional rating of 7 consecutive days of submergence at a maximum depth of 30 feet (9 m).
- d. Motor shall not utilize fan cooling at any time during operation.
- e. Motor shall utilize ceramic shaft seal requiring no oil lubrication.
- f. Motor shall have a minimum service factor of 1.00, 82.5% minimum efficiency factor at full load, minimum 75% power factor at full load.

C. Performance

- 1. Grinder shall be capable of processing 4500 GPM.
- 2. Grinder shall provide a minimum peak shaft torque of 4752 lb-in/hp (721 Nm/kW).
- 3. Grinder shall provide a minimum peak force at cutter tip of 2051 lb_f/hp (12235 N/kW).

2.03 FRAME AND SUPPORTS

A. General

Frame and/or supports shall provide a method for securing grinder in a structure that allows for proper operation.

B. Components

- 1. Frame and/ or supports shall be AISI 304 stainless steel.
- 2. Frame shall provide proper support and interface to guide influent flow into the grinder

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2.04 CONTROL PANEL, ELECTRICAL COMPONENTS & ACCESSORIES

A. GENERAL

Controller shall provide control of the grinder and be designed to control two (2) 5 hp motor at 460 volts, 3 phase, 60 Hz. The controller shall have an indicator lights, switches and other control devices.

B. COMPONENTS

1. Enclosures

- a. Enclosure shall be fiberglass reinforced polyester NEMA 4X .
- b. Enclosure shall house the control devices, motor starters, and PLC.

2. Grinder ON-OFF/RESET-REMOTE three-position 22mm type, NEMA 4X selector switch

- a. In the OFF/RESET position, the grinder shall not run.
- b. In the ON position, the grinder shall run continuously.
- c. In the REMOTE position, the grinder shall start and stop as controlled by an external device.
- d. Selector switch shall be the only method for resetting the controller after a failure.

3. Pilot Lights

- a. Lights shall be LED type 22 mm, rated NEMA 4X.
- b. Lights shall indicate POWER ON, RUN, and FAIL.

4. Programmable Logic Controller (PLC)

- a. PLC shall be manufactured by Allen Bradley or equal.
- b. PLC shall have a minimum of 16K of memory.
- c. Output to Pump Station for:
 - (i) Grinder1 Running
 - (ii) Grinder1 Fault
 - (iii) Grinder 2 Running
 - (iv) Grinder 2 Fault

5. Motor Starter

- a. Starter shall be a full-voltage reversing type with 120 volt operating coils.
- b. Overload relays shall be adjustable and sized to full load amperes (FLA) of the motor.

6. Control Transformer

- a. Control transformer shall be minimum 130 VA.

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- b. Control transformer primary and secondary shall be fused for over current protection.
- 7. Current Transducer
 - a. Current transducer shall be manufactured by Veris Industries.
 - b. Current transducer shall have adjustable set point from 1-135A with 200 ms or less response time.

C. PERFORMANCE

- 1. When a grinder jam obstruction occurs, the controller shall stop the grinder and reverse the rotation to clear the obstruction. If the obstruction is cleared, the controller shall return the grinder to normal operation. If three (3) reverses occur within a 30 second interval, the controller shall stop the grinder motor in a jam condition and activate the grinder FAIL indicator and relay.
- 2. When a power failure occurs while the grinder is operating, the grinder will resume operation once power is restored.
- 3. When a power failure occurs while the grinder is in a fail condition, once power is restored the fail indicator shall reactivate and remain until reset.
- 4. Reset of the grinder shall be accomplished from the controller only.

PART 3 - EXECUTION

3.01 FACTORY TEST:

Test of grinder(s) shall demonstrate correct alignment, smooth operation. Test period shall demonstrate simulated jam condition for grinder.

3.02 INSTALLATION:

Grinder and controller shall be installed in accordance with the supplier's installation instructions, and in compliance with all OSHA, local, state, and federal codes and regulations.

3.03 TRAINING:

A field training course shall be provided for operation and supervisory staff members. Field instruction shall cover items for successful operation contained in the operation & maintenance manuals.

END OF SECTION

SECTION 11371
BLOWERS

PART 1 GENERAL

1.01 SUMMARY

The CONTRACTOR shall furnish all labor, material, tools, supervision, transportation and installation equipment to furnish and install two (2) fully operational 3-lobe rotary type, positive displacement blowers for the wetwell mixing, complete with all auxiliary equipment and accessories, as shown on the drawings and as specified herein.

1.02 REFERENCES

- A. The blowers shall, as applicable, meet the requirements and recommendations of the following industry standards:
 - 1. National Electrical Code (NEC)
 - 2. National Electrical Manufacturers Association (NEMA)
 - 3. American Gear Manufacturers Association (AGMA)
 - 4. Occupational Safety and Health Act (OSHA)
 - 5. American Society of Testing and Materials (ASTM)
 - 6. American Welding Society (AWS)
 - 7. American Institute of Steel Construction (AISC)
 - 8. Anti-Friction Bearing Manufacturers Association (AFBMA)

1.03 SUBMITTALS

- A. Shop Drawing(s)

Supplier shall submit six (6) sets of shop drawings. Shop drawings shall include equipment descriptions, specifications, dimensional and assembly drawings, parts lists, job specific drawings, performance curves and a list of all deviations from the drawings and specifications.

- B. Operation and Maintenance Manuals

Supplier shall submit three (3) sets of Operation and Maintenance manuals. The manuals shall include equipment descriptions, operating instructions, drawings, troubleshooting techniques, a recommended maintenance schedule, and the recommended lubricants.

1.03 QUALITY ASSURANCE:

- A. All equipment furnished under this Section shall be of a single manufacturer who has been regularly engaged in the design and manufacture of the equipment and demonstrates, to the satisfaction of the Engineer, that the quality is equal to equipment made by those manufacturers specifically named herein. The blower manufacturer shall have supplied equipment that has been in successful operation, at similar installations, for at least five (5) years.

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- B. The equipment furnished shall be fabricated, assembled, erected, and placed in proper operating condition in full conformity with approved drawings, specifications, engineering data, and/or recommendations furnished by the equipment manufacturer.
- C. Manufacturer shall factory-test equipment to detect any defects and demonstrate that they will function satisfactorily under the conditions specified. Testing shall include slip testing and mechanical run testing at full pressure and full speed. Manufacturer shall not supply blowers that do not meet the performance standards.

1.05 DELIVERY, STORAGE AND HANDLING

- A. The equipment shall be packaged in containers constructed for normal shipping, handling and storage.
- B. The CONTRACTOR shall store and temporarily support equipment prior to installation in strict accordance with the Manufacturer's recommendations and instructions. Protect all exposed surfaces. Keep records of the storage parameters and the dates that storage procedures were performed. The CONTRACTOR shall be responsible for work, equipment, and materials until inspected, tested and finally accepted.
- C. Protect the equipment from being contaminated by dust, dirt, vibration and moisture.
- D. The unit shall be erected and lubricated in strict accordance with the instructions of the Manufacturer.

1.06 IDENTIFICATION

Each applicable unit of equipment shall be identified with a corrosion resistant nameplate, securely affixed in a conspicuous place. Nameplate information shall include equipment model number, serial number, supplier's name, and location.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. The physical layout of the system as shown on the contract drawings and the equipment specified herein are based upon the model, Omega 21P Plus as manufactured by Kaeser. The use of this system does not remove any responsibility of the CONTRACTOR to verify dimensions and elevations to ensure the equipment will fit within the proposed building and equipment configurations. The use of an "or equal" system will require the manufacturer to provide a modified layout subject to the approval of the ENGINEER. The blowers supplied shall be in compliance with these specifications and plans and shall be supplied by one of the following manufacturers:
 - 1. Kaeser
 - 2. Approved equal
- B. If the CONTRACTOR proposes an "or equal" system, it shall be understood that the proposed system meets or exceeds the specified performance and construction and offers

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a cost savings to the OWNER. The CONTRACTOR may be responsible for engineering time to review proposed substitutions.

2.02 DESIGN CRITERIA

A. GENERAL

1. Contractor shall provide all labor, materials, equipment, installation and assembly hardware supports and appurtenances required to furnish, install and place in satisfactory operation two (2) positive displacement blower.

2. The air blower shall be fabricated, assembled and located as shown on the drawings.

B. OPERATING CONDITIONS

Wetwell Blowers Design Criteria:

- | | |
|---|---------------------------------|
| 1. Power Requirements: | 480 Volt 3 Phase, 4-pole, 60 Hz |
| 2. Number of Blowers: | 2 |
| 3. Blower Model #: | Omega 21P Plus |
| 4. Motor Horsepower: | 7.5 |
| 5. Maximum Blower Speed: | 4,200 RPM |
| 6. Maximum Noise Level (measured 1' outside Enclosure): | 70 dBA |
| 7. Blower Operating Conditions: | |

The blowers shall operate via an blower vendor supplied motor starter panel and shall be capable of operation at all points between 80 SCFM at 8 PSIG to 80 SCFM at 0.0 PSIG. These capacity points shall be demonstrated under inlet conditions of 1 atm pressure, 80% relative humidity and 100 degrees F temperature.

C. BLOWER

The blower shall be able to accommodate the pressure and flow described above. The blower shaft shall be one piece, separate or cast integrally with the impellers. Blower shall be equipped with projecting glass viewports with brass bodies for easy oil level indication from multiple angles. Blowers shall be dynamically balanced and provide oil free non-contact compression.

1. ATTENUATION

- a. Each blower system shall be equipped with an acoustical enclosure. The Enclosures shall be designed, assembled and inspected by the manufacturer at the manufacturing site with documentation provided to verify the noise reduction demanded in these documents. Noise attenuation shall be provided as necessary to reach the specified sound limit requirement at a distance of 1 meter from the operating equipment in a free field environment. All readings shall be taken by personnel experienced in the field of sound attenuation.
- b. The enclosure herein specified shall be designed and manufactured by the blower system manufacturer specifically for the equipment supplied. Units shall be designed to be picked up by a fork truck. Each acoustical enclosure shall be shipped completely assembled. No field assembly shall be permitted

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- c. Absorption of sound waves shall be the basis of design for the enclosure. The complete blower system will be enclosed to meet the level specified. With absorption considered, perforated metal inner skin retaining devices shall not be considered acceptable.
- d. Absorption media shall be a nominal 2-inch thick resilient material capable of returning to its original form after compression. Media shall have an overall weight of not less than 1.6 pounds per cubic foot. Media sheets shall have an upper oil resistant layer a minimum of three mils in thickness to protect the integrity of the media. Absorption media shall be interior and be fitted to each exterior facet and show contact at all points. Media shall be snug fit, be complete with pressure sensitive adhesive and held in place with washers, studs and cap nuts manufactured from corrosive resistant materials. All adhesives used in anchoring studs or other items in structure shall be high temperature industrial material rated for the application.
- e. Outer skin shall be a minimum 14 gauge galvanized steel. Enclosure panels to be 10 gauge aluminum. Lesser gauges shall not be acceptable. All surfaces are to be powder coated per the Coatings section.
- f. No fastening hardware shall be visible on the exterior of the enclosure except those holding the instruments and relief valve exhaust differ in place for ease of repair. Rivets or loose fitting panels which can loosen during operation will not be accepted. Slide-in panels showing a loose fit shall provide grounds for rejection.
- g. Each enclosure will have removable service panels. All surfaces and edges shall be free of burs and sharp edges. Panels shall lock closed using key-operated compression latches with folding handles that fit flush.
- h. Each enclosure shall incorporate internal acoustical-lined intake-air vent boxes rated for the SCFM listed in the "service" section and discharge pipe openings with sound seal. Louvers shall not be acceptable.
- i. A 120/60/1 electric cooling fan with thermostat control and acoustical vent shall be supplied installed on the enclosure. To ensure adequate cooling at all speeds the cooling fan will not be connected to the blower or motor shaft in any way.

D. MOTOR

DESIGN:	B, squirrel-cage, induction per NEMA MG1 & IEEE standards
HP:	Nameplate greater than the brake horsepower at 10% above the relief valve set pressure
RPM:	4200
TYPE:	TEFC

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POWER:	480 Volt, 3 phase, 60 Hertz
INSULATION:	Class F with class B rise
SERVICE FACTOR:	1.15 (or 1.0 if used in conjunction with VFD) at power voltage and site elevation listed above
EFFICIENCY:	"premium efficient" per latest edition of NEMA MG1

E. V-BELT

High-capacity type, oil and heat resistant, static-dissipating drive belts selected to have a 1.4 or higher service factor above the required blower brake horsepower. Sheaves shall mount to the blower and motor shafts with QD type bushings.

F. DRIVE GUARD

The guard shall be fabricated steel with openings on the front designed to allow ample ventilation for the drive, have an easy access cover and conform to applicable safety codes.

G. BASE

Base shall include spring loaded auto-tension device for ease of drive installation and maintenance. Covered forklift slots shall be integral to the base design. The blower base shall have isolation mounts to minimize transmitted vibrations from the blower system to the surrounding structure.

H. ACCESSORIES

1. INLET FILTER/SILENCER

Each blower will have a filter/silencer with paper media that removes 99.5% of 2 micron particles. The maximum pressure drop across the clean element shall be less than 2-inches of water column. The filter/silencer shall be Stoddard FH64 or equal.

2. DISCHARGE SILENCER

Silencers shall be of the helical-flow design and separate from the base frame. Air velocity shall be 5500 to 7000 feet per minute.

3. FLEXIBLE JOINT

Each blower shall have a flexible joint located between the blower and discharge silencer to minimize vibration transmission to downstream piping. The joint's elastomer must be rated higher than the maximum expected service temperature and pressure.

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Each blower shall have an external discharge flexible joint that matches the blower discharge silencer size. The joint's elastomer must be rated higher than the maximum expected service temperature and pressure. The flexible joint shall ship installed on the system.

I. VALVES

1. PRESSURE RELIEF VALVE

Each blower shall be protected by a spring loaded pressure relief valve preset to start opening at half a PSIG above the PSIG listed in the "service" section, be full open at not more than 10% above the set pressure, and rated for the SCFM and PSIG listed in the "service" section. If the valve malfunctions it shall do so in the open condition to prevent blower damage. Valve shall vent outside of the enclosure.

2. CHECK VALVE

Each blower shall have a discharge check valve. Valves 6-inch and smaller shall have a NPT steel body. Valves 8-inch and larger shall have a cast-iron wafer body. Internals shall be aluminum split discs with no-pinch elastomer and seal rated above the maximum anticipated discharge temperature. Valve shall be shipped installed on the system.

3. ISOLATION VALVE

Each blower shall have a discharge isolation valve. Valves less than two inches in diameter will be ball valves. Valves 2-inches and larger shall be cast-iron wafer-body butterfly type with a locking handle. The temperature rating of the seat must exceed the maximum anticipated discharge temperature. The valve shall be shipped installed on the system.

J. INSTRUMENTS

1. PRESSURE GAUGE

Each blower shall have a 2-1/2" diameter, stainless steel case, brass bourdon tube, liquid filled, 1/4 NPT connection pressure gauge with a 0-15 PSIG scale on systems operating up to 10 PSIG and 0-30 PSIG for higher pressures. Gauge shall have a 1/4" brass snubber and isolation valve and be mounted in the enclosure wall. Gauge shall be Winters 901 or equal.

2. FILTER RESTRICTION GAUGE

Each inlet filter/silencer shall have a gauge, with isolation valve, to measure vacuum in the filter element. The gauge shall have a visual indicator to lock at the current vacuum when the blower is shut off and have a manual reset. Gauge shall be mounted in the enclosure wall. Gauge shall be Dwyer Magnehelic or equal.

3. THERMOMETER

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Each blower shall have a 4.5" diameter thermometer with a 50-300 °F scale on systems up to 10 PSIG, 50-500 °F for higher pressure. Thermometer shall be mounted in the enclosure wall. The thermometer shall be Wika TI.V45RB or equal.

K. COATINGS

Equipment shall be cleaned to SSPC-SP 3 and receive a 2-3 mil DFT shop coat of Corotek 131 universal primer. The systems shall then receive a finish coat of Corotek 220 alkyd enamel, 50% gloss, high temperature paint. The coat shall be 2-3 mil DFT.

Enclosures shall be powder coated with a coating that is highly resistant to UV rays and weather. Tiger Drylac Series 38 super durable or equal.

PART 3 EXECUTION

3.01 INSTALLATION

Installation shall be installed in strict conformance with the manufacturer's installation instructions, as submitted with Shop Drawings, Operation & Maintenance Manuals and/or any pre-installation checklists. Installation shall utilize standard torque values and be installed secure in position and neat in appearance. Installation shall include all site preparation tasks and any other installation tasks and materials as determined by the customer and/or specified by the manufacturer.

3.02 FIELD QUALITY CONTROL

A. Operational Test

1. Prior to acceptance by OWNER, formal start-up and testing of all equipment and control systems shall be conducted by the CONTRACTOR, in the presence of the ENGINEER and a representative of the blower vendor, to determine if the installed equipment meets the purpose and intent of the specifications. Tests shall demonstrate that all equipment is electrically, mechanically, structurally, and otherwise acceptable; it is safe and in optimum working condition; and conforms to the specified operating characteristics.

B. Manufacturer Training

1. A representative of the of the blower supplier shall, at the successful completion of start-up provide one day of on-site training for the operators and shall demonstrate the basic operation and maintenance procedures. This training may not be conducted until such time that all start-up and testing has been successfully completed. The vendor is cautioned that these training sessions must be scheduled in advance and have prior approval to be considered completed.
2. Follow-up service: The manufacturer's representative shall return to the facility at the end of the Warranty period to address any operational issues which have arisen. This

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inspection does not eliminate the possible need for the representative to return sooner if equipment problems arise.

3.03 WARRANTY

A written one year warranty effective from the date of the successful equipment start-up shall be provided by the equipment supplier to guarantee that there shall be no defects in material or workmanship in any item supplied.

3.04 SPARE PARTS

A. The Contractor shall furnish the following spare parts in clearly identified containers:

- | | |
|--|-----|
| 1. One filter element for each blower | (1) |
| 5. One complete set of V-belts | (1) |
| 5. One years supply of applicable lubricants | (1) |

END OF SECTION

SECTION 11374
COARSE BUBBLE DIFFUSER SYSTEM

PART 1 GENERAL

1.01 SUMMARY

- A. The CONTRACTOR shall furnish all labor, material, tools, supervision, transportation and installation equipment to furnish and install all components of the coarse bubble aeration system within the two (2) flow equalization basins. These components include but are not limited to; stainless steel droplegs and air distributors, stainless steel supports and anchors, anchorage hardware, air distribution purge systems, and diffusers. The manufacturer shall supply all appurtenances as described herein or as shown on the drawings which are required for the proper operation of the fine bubble diffuser system.

1.02 SUBMITTALS

- A. Supplier shall submit three (3) sets of shop drawings. In general, shop drawings shall include equipment descriptions, specifications, dimensional and assembly drawings, parts lists, and job specific drawings. Detailed shop drawings shall be as follows:
1. Submittal drawings showing plan, elevation and cross sections of the equipment.
 2. Component details of the aeration equipment showing diffusers, diffuser holders, gaskets, retainer rings, supports, threaded union and/or flanged joints and a purge system.
 3. Materials and Manufacturing specifications.
 4. Equipment booklet including:
 - a. Equipment data sheets
 - b. Complete design calculations
 - c. Headloss calculations and pressure requirements.
 - d. Descriptive literature and bulletins.
 - e. Customer contact list with telephone numbers (minimum of 10 contacts from similar size facilities).
 5. Installation instructions. Submit after approval of equipment and prior to shipment.
 6. Detailed list of any exceptions taken to these specifications. Include specification reference and proposed alternative with reason stated for exception.
- B. Operation and Maintenance Manuals

Supplier shall submit three (3) sets of Operation and Maintenance manuals. The manuals shall include equipment descriptions, operating instructions, drawings, troubleshooting techniques and a recommended maintenance schedule.

1.03 QUALITY ASSURANCE:

- A. All equipment furnished under this Section shall be of a single manufacturer who has been regularly engaged in the design and manufacture of the equipment and demonstrates, to the satisfaction of the Engineer, that the quality is equal to equipment made by those manufacturers specifically named herein. The aeration system manufacturer shall have supplied equipment that has been in successful operation, at similar installations, for at least ten (10) years.

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COARSE BUBBLE DIFFUSER SYSTEM

- B. The equipment furnished shall be fabricated, assembled, erected, and placed in proper operating condition in full conformity with approved drawings, specifications, engineering data, and/or recommendations furnished by the equipment manufacturer.

1.04 DELIVERY, STORAGE AND HANDLING

- A. The equipment shall be packaged in containers constructed for normal shipping, handling and storage.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. The physical layout of the system as shown on the contract drawings and the equipment specified herein are based upon a system as manufactured by Stamford Scientific. The use of this system does not remove any responsibility of the CONTRACTOR to verify dimensions and elevations to ensure the equipment will fit within the existing tanks and equipment configurations. The use of an "or equal" system will require the manufacturer to provide a modified layout subject to the approval of the ENGINEER. The aeration system supplied shall be in compliance with these specifications and plans and shall be supplied by one of the following manufacturers:

1. Stamford Scientific International, Inc
2. Approved Equal

- B. If the CONTRACTOR proposes an "or equal" system, it shall be understood that the proposed system meets or exceeds the specified performance and construction and offers a cost savings to the OWNER. The CONTRACTOR may be responsible for engineering time to review proposed substitutions.

2.02 DESIGN CRITERIA

- A. OPERATION CONDITIONS, AERATION BASINS

:

Design Criteria:

- | | | |
|----|--------------------------------------|--------------------------------------|
| 1. | Diffuser Location: | Flow Equalization Basin |
| 2. | Number of Trains: | 2 |
| 3. | Maximum Air Rate: | 28 scfm / basin |
| 4. | Minimum Air Rate: | 10 scfm/basin |
| 5. | Maximum Diffuser Submergence: | 7.0' |
| 6. | Minimum Diffuser Submergence: | 1.0' |
| 7. | Minimum Number of Diffusers / Basin: | 5 / Basin |
| 8. | Diffuser Model : | SSI Reliaball Coarse bubble diffuser |

2.03 MATERIALS

- A. STAINLESS STEEL – PIPE, FITTING AND SUPPORTS

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COARSE BUBBLE DIFFUSER SYSTEM

1. Fabricate all welded parts and assemblies from sheets and plates of 304L stainless steel with a 2D finish conforming to ASTM A240, 554, 774, 778.
2. Fabricate non-welded parts and flanges from sheets, plates or bars of 304 stainless steel conforming to ASTM A240 or ASTM A276.
3. Welds & Welding Procedure
 - a. Weld in the factory with ER 316L filler wire using MIG, TIG or plasma-arc inert gas welding processes. Provide a cross section equal to or greater than the parent metal.
 - b. Provide full penetration butt welds to the interior surface with gas shielding of interior and exterior of joint.
 - c. Continuously weld both sides of face rings and flanges to eliminate potential for crevice corrosion.
4. Corrosion Protection and Finishing

Clean all welded stainless steel surfaces and welds after fabrication by using the following procedure:

 - a. Pre-clean all outside weld areas to remove weld splatter with stainless steel brushes and/or deburring and finish grinding wheels.
 - b. Finish clean all interior and exterior welds and piping by full immersion pickling and rinse with water to remove all carbon deposits and contaminants to regenerate a uniform corrosion resistant chromium oxide film per ASTM A380 Section 6.2.11, Table A2.1 Annex A2 and Section 8.3.
 - c. Corrosion protection techniques not utilizing full immersion methods are unacceptable and will be cause for rejection of the equipment.

2.04 FINE BUBBLE AERATION SYSTEM COMPONENTS

A. DROPLEGS

1. Provide a stainless steel dropleg from the air main connection to the dropleg connection on the manifold. The dropleg size shall be as shown on the Contract Plans.

B. AIR DISTRIBUTORS AND DIFFUSER HOLDERS

1. Provide 2 inch diameter air distributors perpendicular to the air manifold

C. AIR DISTRIBUTOR AND MANIFOLD CONNECTION JOINTS

1. Join air distributor sections with positive locking fixed threaded union or flange type joints for all submerged header joints to prevent blow apart and rotation.
2. Bell and spigot, slip on or expansion type joints are not acceptable for submerged joints.
3. Design threaded union joints with spigot section connected to one end of the distribution header, a threaded socket section connected to the mating distribution header, an "O" ring gasket and a threaded screw on retainer ring. Solvent welding shall be done in the factory.
4. Design flanged joints with a 125 lb drilling angle face ring, follower flange and stainless steel hardware.

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COARSE BUBBLE DIFFUSER SYSTEM

D. DIFFUSER ASSEMBLIES

1. Furnish diffuser assemblies including diffuser, diffuser gasket, holder, retaining ring and air flow control orifice.

E. ANCHOR BOLTS

1. Design anchor bolts for embedment in 4000 psi concrete with a pullout safety factor of 4.
2. Provide a mechanical stainless steel expansion type anchor bolt system.

PART 3 EXECUTION

3.01 INSTALLATION

A. INSTALLATION PROCEDURE

1. Follow equipment manufacturer's recommendations for sequencing of equipment installation.
2. Layout and install support anchors in accordance with equipment manufacturer's recommendations and anchor setting plan.
3. Level aeration system such that all diffusers connected to a header are within plus or minus 1/4 inch of a common horizontal plane.

B. INSTALLATION/START UP SERVICES

The fine bubble diffuser supplier shall provide the services of a competent factory representative familiar with installation and operation of the complete aeration system to answer any questions via telephone the installing contractor or operations personnel may have prior to, during and after the installation of the aeration system.

1. Provide services of a factory representative for three (3) days to verify the proper installation of the equipment.
2. Provide services of a factory representative for one (1) day to instruct owner's personnel on operation and maintenance.

3.02 FIELD QUALITY CONTROL

A. Operational Test

1. Prior to acceptance by OWNER, formal start-up and testing of all equipment be conducted by the CONTRACTOR, in the presence of the ENGINEER and a representative of the diffuser equipment vendor, to determine if the installed equipment meets the purpose and intent of the specifications. The equipment vendor shall note that the startup of the diffuser system will be in stages in accordance with Specifications Section 01305 and multiple startup trips will be required. Tests shall demonstrate that all equipment is mechanically, structurally, and otherwise acceptable; it is safe and in optimum working

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COARSE BUBBLE DIFFUSER SYSTEM

condition; and conforms to the specified operating characteristics. The start-up testing shall, at a minimum be as follows:

- a. Prior to commencing with testing, ensure that the entire piping system is free of moisture, debris and obstructions. Verify that all fasteners and couplings are properly aligned and tightened to the specified torque.
- b. Water shall be carefully added to the basins to a depth just under the surface of the diffuser elements. Elevation of the grids shall be verified to be within +/- ¼ inch of a common plane. Process air shall then be introduced to the system at a low rate to check for piping and diffuser holder leaks. Any leaks shall be corrected and retested.
- c. After the system elevation has been verified and the piping checked for leaks, the water depth shall be increased to obtain 2-3 inches of water over the diffuser elements. Process air shall again be introduced to the system to check the diffuser element and diffuser holder for any leaks. Any leaks shall be corrected and retested.
- d. Should the system fail under any of these conditions, the tests shall be halted and the problem corrected. If, after several attempts, the system does not successfully pass the testing requirements, the faulty portion of the equipment shall be replaced and retested.

B. Manufacturer Training

1. A representative of the of the diffuser equipment supplier shall, at the successful completion of start-up provide one day of on-site training for the operators and shall demonstrate the basic operation and maintenance procedures. This training may not be conducted until such time that all start-up and testing has been successfully completed. The vendor is cautioned that these training sessions must be scheduled in advance and have prior approval to be considered completed.
2. Follow-up service: The manufacturer's representative shall return to the facility at the end of the Warranty period to address any operational issues which have arisen. This inspection does not eliminate the possible need for the representative to return sooner if equipment problems arise.

3.03 WARRANTY

A written one year standard warranty from the date of the successful equipment start-up shall be provided by the equipment supplier to guarantee that there shall be no defects in material or workmanship in any item supplied.

END OF SECTION

SECTION 11374
COARSE BUBBLE DIFFUSER SYSTEM

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SECTION 11700
INSTRUMENTATION EQUIPMENT

PART 1. GENERAL

1.01 SUMMARY

- A. This Section provides acceptable products and product requirements and installation considerations for process control and monitoring equipment to be installed.

1.02 RELATED SECTIONS

- A. Section 11750 – Pump Station Control System
- B. Section 16100 – Basic Electric Methods

1.03 SUBMITTALS

- A. Catalog Cuts and Shop Drawings shall be submitted for approval for all equipment herein specified.
- B. An Order Specification shall be included which shall describe in detail all equipment provided.
- C. Manufacturer's wiring diagrams that are not job-specific (standard drawings with options crossed out, etc.) are not acceptable. Standard sales brochures shall only be provided to supplement technical data. Interconnection details shall be shown on the wiring diagrams for all field mounted instrumentation.
- D. A Description of Operation shall be provided detailing the operation of the component, initial configuration settings, and maintenance requirements.
- E. Supplier shall submit six (6) sets of shop drawings. Shop drawings shall include equipment descriptions, specifications, dimensional and assembly drawings, parts lists, and job specific drawings.
- F. Supplier shall submit three (3) sets of Operation and Maintenance manuals. The manuals shall include equipment descriptions, operating instructions, drawings, troubleshooting techniques, a recommended maintenance schedule, and the recommended lubricants.

1.04 SUPPLIERS

- A. Acceptable suppliers:
 - 1. All equipment specified in this Section as well as Section 11750 – Pump Station Control System shall be provided by the Pump Station Control System Supplier.
 - 2. Where products of alternate suppliers are proposed, provide submittal information on the Specified Item and the Or Equal Item proposed. To verify suitability of Or Equal, Contractor may be required to furnish additional documentation or to extend product warranties.
- B. Where products of specific manufacturers are specified, the I&C Supplier shall be responsible for integrating the part into the overall systems.

1.05 QUALITY ASSURANCE

- A. Provide functional testing of all installed components in accordance with a schedule approved by the Engineer.

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INSTRUMENTATION EQUIPMENT

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Equipment will not be delivered to the site until they are ready to be installed. Equipment stored on site will be stored in clean dry heated space and protected by the Contractor at his expense until the item is to be installed.

PART 2. PRODUCTS

2.01 FLOW INDICATORS

- A. General
 - 1. All components which will be subjected to sunlight or UV shall be UV resistant or protected. This includes all enclosures, sensors, junction boxes and all other components.
- B. Electromagnetic Flow Meter
 - 1. Effluent Flow Meter
 - a. Furnish and install two (2) twelve-inch (12") electromagnetic flow meter and transmitter for measuring the discharge from the pump station.
 - b. Meter shall be furnished with polyurethane lined flowtube
 - c. A 2-line, 16-digit LCD backlit display shall indicate flow rate and/or total flow. The totalizer value shall be protected by EEPROM during power outages, and utilize an overflow counter. The display shall also be capable of indicating error messages such as empty pipe condition, error condition, and low flow cutoff.
 - d. Flow meter shall provide a 4-20 mA output signal transmitting the instantaneous flow rate to the pump control panel.
 - e. Analyzer shall be remote and mounted to new pump building walls per the Contract Drawings, contractor shall furnish appropriate amount of cable.
 - f. Input power shall be 120 volts
 - g. The electromagnetic induction flowmeter shall generate a voltage linearly proportional to flow for full-scale velocity settings from 0 to 33 feet per second. Standard accuracy of the pulse output shall be $\pm 0.5\%$ of rate $\pm 0.01\%$ of full scale (33 ft/sec) for all meters.
 - h. The flow meter shall itself shall be rated for submergence.
 - i. Meter shall be Endress and Hauser PROline ProMag or approved equal.

2.02 LEVEL INDICATORS

- A. Pressure Transducers
 - 1. Pressure Transducer indicators shall be furnished and installed to monitor the following:
 - a. Wetwell Level #1.
 - b. Wetwell Level #2.

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INSTRUMENTATION EQUIPMENT

- c. Indicators shall be of a design suitable for measuring fluid level and shall include any extensions, hardware, or mountings as needed for accurately measurement.
- 2. Transmitters shall be installed as shown on the Drawings.
- 3. Sensor shall be constructed to withstand high submersive environments.
- 4. Sensor shall be mounted remotely from other electronic components.
- 5. All wiring connections shall be through threaded conduits. Unit shall be sealed to prevent damage in the event of accidental submergence in water.
- 6. Sensor shall come equipped with a seal and recessed diaphragm.
- 7. Sensor shall be of a design to prevent condensation built-up.
- 8. Units shall provide built-in temperature compensation.
- 9. Sensors shall provide a 4-20 mA output signal transmitting the level to the pump station cp. Refer to the Contract Drawings and Section 11750 – Pump Station Control System for details.
- 10. Two wire, loop powered, 12-28 VDC – The Instrumentation vendor shall include provisions within all applicable control panels for boosters to account for conductor run distances.
- 11. Sensors shall come with integral mounted Level Guard.
- 12. Sensors shall come with bellows style vent tube system.
- 13. Sensors shall be WIKA LS-10 or approved equal.

B. Level Floats

- 1. Level Floats Shall be furnished and installed to monitor the following
 - a. Influent Channel High Level
 - b. Wet Well#1 High Level
 - c. Wet Well#2 High Level
 - d. Wet Well#1 Low Level
 - e. Wet Well#2 Low Level
 - f. Dry Well Sump High Level
- 2. Floats shall be installed as indicated on the Drawings.
- 3. Floats shall be constructed of PVC chemical resistive materials.
- 4. Floats shall be rated for 13 Amps SPDT.
- 5. Floats shall have the cable weight option provided.
- 6. Floats shall be Pulsar Process Measurement Model 800-20 Pump Master or Engineer Approved Equal.

2.03 PRESSURE INDICATORS

A. Pressure Switches

- 1. Furnish and install pressure switches at each pump effluent.
- 2. Pressure switches shall be NEMA 4X and IP66
- 3. Pressure switch shall be rated for 15A, 125/250VAC
- 4. Actuator seals shall be Buna-N
- 5. Switch shall be 0-200psi
- 6. Switch shall be Ashcroft B-Series with Type 100 Diaphragm Seal or Engineer Approved Equal

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B. Pressure Gauge

1. Furnish and install pressure gauges on the influent and effluent of each pump.
2. Gauges shall have an accuracy of ½% of full scale.
3. Gauges shall have 4 ½ "diameter.
4. Gauges shall constructed of black phenolic case, glass window, aluminum dial, rotary movement 400 SS Teflon® coated pinion gear, Bourdon tube, 1/2" NPT Process connection
5. Gauges shall be Ashcroft 1279 Duragauge® PLUS with Type 100 Series Diaphragm Seals.

C. Pressure Transmitter

1. Pressure indicators shall be furnished and installed to monitor the following:
 - a. Pump#1 Discharge Pressure
 - b. Pump#2 Discharge Pressure
 - c. Pump#3 Discharge Pressure
 - d. Pump#4 Discharge Pressure
 - e. Pump#5 Discharge Pressure
 - f. Pump#6 Discharge Pressure
2. Pressure transducers shall be supplied and installed to provide pressure at the discharge of each pump.
3. Indicators shall be of a design suitable for measuring gauge pressure and shall include any extensions, hardware, or mountings as needed to accurately measure water levels. Transmitters shall be installed with block and bleed valves.
4. All wiring connections shall be through threaded conduits. Unit shall be sealed to prevent damage.
5. Units shall provide built-in temperature compensation.
6. Sensors shall provide a 4-20 mA output signal transmitting the pressures to the PLC.
7. Two wire, loop powered, 12-28 VDC – The Instrumentation vendor shall include provisions within all applicable control panels for boosters to account for conductor run distances.
8. Sensors shall be Endress Hauser Cerabar S, or approved equal.

2.04 GAS MONITORING

Alarm system shall be installed per NFPA72 and adhere to state and local licensing. System shall be as designed and supported by Alarm & Suppression, Inc., Balston Lake, NY or Engineer Approved Equal.

A. Explosive Gas Sensor

1. Two (2) explosive gas sensor indicators shall be furnished and installed to monitor the following.
 - a. Wetwell
2. Indicators shall be of a design suitable for monitoring LEL, calibrated for methane and shall include any extensions, hardware, or mountings as needed for accurately monitoring.

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3. Transmitters shall be installed as shown on the Drawings.
4. Sensor shall be constructed within an explosion proof housing.
5. A LCD backlit display shall indicate percent LEL locally.
6. The sensor shall transmit the percent LEL to the corresponding pump station control panel.
7. Sensors shall provide a 4-20 mA output signal transmitting the percent LEL to the pump station cp. Pump station control panel shall monitor and display the % LEL. Refer to the Contract Drawings and Section 11750 – Pump Station Control System for details.
8. Two wire, loop powered, 12-28 VDC – The Instrumentation vendor shall include provisions within all applicable control panels for boosters to account for conductor run distances.
9. Sensors shall be Sensidyne or approved equal

B. Oxygen gas sensor

1. Two (2) oxygen gas sensor indicators shall be furnished and installed to monitor the following:
 - a. Wetwell
2. Indicators shall be of a design suitable for monitoring O₂, calibrated for O₂ and shall include any extensions, hardware, or mountings as needed for accurately monitoring.
3. Transmitters shall be installed as shown on the Drawings.
4. Sensor shall be constructed within an explosion proof housing.
5. A LCD backlit display shall indicate percent O₂ locally.
6. The sensor shall transmit the percent O₂ to the corresponding pump station control panel.
7. Sensors shall provide a 4-20 mA output signal transmitting the percent O₂ to the pump station cp. The pump station cp shall monitor and display the O₂ level. Refer to the Contract Drawings and Section 11750 – Pump Station Control System for details.
8. Two wire, loop powered, 12-28 VDC – The Instrumentation vendor shall include provisions within all applicable control panels for boosters to account for conductor run distances.
9. Sensors shall be Sensidyne or approved equal

C. H₂S sensor

1. Two (2) hydrogen sulfide gas sensor indicators shall be furnished and installed to monitor the following:
 - a. Wetwell
2. Indicators shall be of a design suitable for monitoring H₂S, calibrated for H₂S and shall include any extensions, hardware, or mountings as needed for accurately monitoring.
3. Transmitters shall be installed as shown on the Drawings, approx 4-6 ft above ff elevation
4. Sensor shall be constructed within an explosion proof housing.
5. A LCD backlit display shall indicate percent H₂S locally.
6. The sensor shall transmit the percent H₂S to the corresponding control panel.

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7. Sensors shall provide a 4-20 mA output signal transmitting the percent H₂S to the SCADA system via PLC-1. PLC-1 and the SCADA system shall monitor and display the H₂S level. Refer to the Contract Drawings and Section 406000 - SCADA system for details.
8. Two wire, loop powered, 12-28 VDC – The Instrumentation vendor shall include provisions within all applicable control panels for boosters to account for conductor run distances.
9. Sensors shall be Sensidyne or approved equal

PART 3 EXECUTION

3.01 FLOW INDICATORS

- A. Flow meter sensors shall be installed per the manufacturer's recommendations and the Contract Drawings.
- B. Provide insulated anchor mounts directly connected to sound concrete or other approved surface.
- C. All transmitters shall be remote and wall mounted per the Contract Drawings.

3.02 LEVEL INDICATORS

- A. Liquid level sensors shall be securely mounted in the liquid being measured and shall be easily accessible.
- B. Provide insulated anchor mounts directly connected to sound concrete or other approved surface.
- C. Floats shall be installed with a stainless steel anchor and stainless steel chain in the wetwells.

3.03 PRESSURE INDICATORS

- A. Pressure sensors shall be securely mounted to the process being measured and shall be easily accessible.
- B. Differential pressure sensors shall be mounted to 2" Stainless Steel wall mount.
- C. Provide insulated anchor mounts directly connected to sound concrete or other approved surface for submersible sensors.

3.04 GAS MONITORING

- A. Gas monitors shall be installed per manufacturers recommendations at the locations indicated on the plans.
- B. Gas monitor mounts shall be supplied by the instrumentation vendor and shall be designed such that the sensors are easily removed from the pipe for cleaning and maintenance.

3.05 WARRANTY

A written one year standard warranty from the date of the successful equipment start-up shall be provided by each equipment supplier to guarantee that there shall be no defects in material or

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workmanship in any item supplied. This shall be in addition to the Warranty as required for the Pump Station Control System.

END OF SECTION

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PART 1 GENERAL

1.01 SUMMARY

- A. All equipment and wiring shall conform to standard electrical practice and to all applicable sections of the NEC reference to low voltage applications.
- B. Include, in general, with the PUMP CONTROL System but without limitation:
 - 1. Control panel enclosure for the Saw Mill pump station is existing but shall be modified by the integrator to accept the new application.
 - 2. All necessary hardware, software and programming (both for upgrades to existing systems and for new applications) to perform the PUMP CONTROL functions described herein and required for operation of the system.
 - 3. All interconnecting cables for connecting the instrumentation to the appropriate PLC equipment.
 - 4. Pump control panel for one pump station: Saw Mill.
 - a. The PLC is existing and the integrator shall reprogram for the new application.
 - b. The OIT is existing and the integrator shall reprogram for the new application.
 - 5. Saw Mill Pump Station Control Panel shall include control application for six 70HP pumps operating at 480V 3Phase power.
 - a. Four (4) Effluent Pump
 - b. Two (2) Storm Flow Pumps
 - 6. Historical data will be saved to files locally at the control panel.
 - 7. Furnish and supply variable frequency drives.
 - 8. Furnish and install pressure transducers for level monitoring.
 - 9. Furnish and install two (2) flow meter at the pump station effluent.
 - 10. Furnish and install one (1) flow meter at the pump station influent.
 - 11. Furnish and install VFDs for the Wetwell Compressors.
 - 12. All instrumentation shall be powered from the pump station control panels. The control panel vendor shall provide adequate protection and terminals.
- C. The Saw Mill Pump Station Control System shall consist of a Pump Control Panel, VFDs for each pump, control and monitoring of six pumps, control and monitoring of wet well level, monitoring of the grinder, control of compressor, monitoring the backup generator, monitoring the fire detection system, etc. The Saw Mill Pump CP shall be located in the location indicated on the electrical drawings. The Pump CP shall include terminal strips to allow for termination of the conductors to the appropriate locations within the CP.

The pump station control vendor shall furnish and install temporary programming at startup. When the pump station is initially started two pumps will be on VFDs and the other pumps will remain on existing starters. This will allow for the installation and demolition of the remaining components. See section 01305 Construction Sequencing for more information.

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- D. The PUMP CONTROL System shall execute the following functions:
1. Monitor and control operations via a local operator interface terminals (OIT) consisting of industrial computer with panel mounted touch screen and HMI client application software for operator workstation. There shall be one OIT at the pump station and the functionality of the operator workstation shall be duplicated at the DPW office.
 2. Automatically record information pertaining to these operations in historical files.
 3. Communicate between hardware components and field instrumentation.
 4. Display all monitored values and alarms at the local operator interface.
- E. The pump control panel vendor shall also furnish the pump VFDs. These shall be 6-70HP 480V 3 phase for the Saw Mill Pump Station. VFDs shall be in a NEMA 12 enclosure. The VFDs shall also come equipped with an Ethernet adapter for communication to the pump station cp for complete control and diagnostic capabilities.
- F. The VFD enclosures shall come equipped with LCD Display and Keypad, elapsed time meter, a speed control pot to ramp the pump speed up and down when in hand, HOA switch, Start Push Button, Stop Push Button, RUN and FAIL pilot lights, a local E-Stop Button, and a remote mounted E-Stop Button. (located in drywell near pump). The VFD's shall come equipped with the proper I/O necessary to enable float control as outlined in this specification as well as Ethernet Communications to the PLC to enable automatic functionality. The HOA switch will be used in auto control mode. The pump station cp will control the VFD in auto control mode based on the wet well level transducer outputs. If the pump station cp faults in auto control mode for any reason i.e. power loss, PLC failure, Instrument failure, the VFD will automatically operate in float control mode. When the VFD HOA is in the hand control mode the operator will have direct control via the start, stop buttons and speed pot. The VFD will only operate automatically in the auto mode. Likewise the VFD is entirely dependent upon the operator while in the hand mode.
- G. The Pump Control Panel shall monitor the HOA and control the pumps accordingly. In the auto mode the pump will operate to maintain a level in the wetwell. The redundant pressure transducers shall be installed in the wetwells of the pump station to monitor level. When the level rises above an operator adjustable setpoint the lead pump will come on. The control panel will ramp the pump up and down to maintain a level in the wetwell. If the wetwell level were to continue to rise the operator adjustable lag pump on setpoint in the control panel will start the lag pump, and open the lag pump check valve in a similar fashion as the lead pump. When the Lag pump comes on the lead pump will be set to 100% and the lag pump will be ramped up and down to maintain the level in the wetwell. See strategy below for a more detailed outline.

The pump control panel will also monitor the fire alarm system in the building. In case of an alarm condition the control panel shall include a relay to lockout all roof ventilators.

The pump control panels will also monitor grinder operations, building alarm systems, etc.

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- H. Include field-testing and services of qualified representatives of the PUMP CONTROL System supplier.
- I. It is the intent of this Contract that the PUMP CONTROL installations be complete in all respects and ready for use and operation. The Contractor shall be responsible for all details, devices, accessories and special construction necessary to properly finish, install, adjust, test and place in successful continuous operation a complete installation.
- J. Control Panel shall be installed in such a manner as to provide temporary control logic to run existing pumps to enable decommissioning of existing pumps, switch gear, and installation of the new pumps in a smooth transition. This will require coordination with the electrical and mechanical contractors.
- K. The Schedules in this Section are not necessarily complete. The Contractor shall not rely on the Schedules but shall thoroughly examine the Contract Documents prior to bid to determine the work required under this Contract.

1.02 QUALITY ASSURANCE

- A. All equipment covered by these specifications shall be the products of reputable, qualified, and successful manufacturers who are of proven ability and have long experience in the production of such equipment.
- B. All equipment specified in this Section shall be provided by the PUMP CONTROL System Supplier.
- C. The Contractor shall pay all royalty or license fees for use of patented devices or systems and shall protect the Owner from patent infringement litigation thereon.
- D. All components of the PUMP CONTROL System have been included under this Section so that the OWNER will receive completely coordinated and properly integrated system for efficiency, ease in operation and, correct functional relationship among all elements of the system. Therefore, it is the intent of this Contract that the equipment specified under this Section will be furnished by a single PUMP CONTROL System Supplier. This does not require that all equipment be manufactured by a single manufacturer, but does require that the PUMP CONTROL System Supplier be responsible for the satisfactory operation of the instrumentation and metering equipment and the PUMP CONTROL System furnished hereunder.

1.03 SYSTEMS INTEGRATOR:

The physical layout of the PUMP CONTROL system is shown on the contract drawings and the equipment specifications. The use of an "or equal" system will require the PUMP CONTROL supplier to document experience on at least 10 similar systems with major

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upgrades of equal size or larger subject to the approval of the ENGINEER. The PUMP CONTROL System shall be in compliance with these specifications and plans.

- A. If the Contactor proposes an “or equal” PUMP CONTROL system, it shall be understood that the proposed system meets or exceeds the specified performance and construction and offers a cost savings to the OWNER. The CONTRACTOR may be responsible for engineering time to review proposed substitutions.
- B. The following is a minimum qualifications submittal:
 - 1. PUMP CONTROL system supplier shall submit, within 15 (fifteen) calendar days of the bid, detailed information on their staff and organization to show compliance with the Quality Assurance requirements of this Section. The Qualifications submittal shall be submitted and favorably reviewed before any further submittals will be accepted. Failure to meet the minimum requirements shall be grounds for rejection as acceptable.
 - 2. Copy of UL-508 certificate for panel fabrication facilities.
 - 3. Five (5) references for water or wastewater projects successfully completed within the last five years. Successful completion shall be defined as a finished project completed on time and within budget. Potential references shall be for projects where the PUMP CONTROL system supplier’s contract, excluding change orders, is \$75,000 minimum.
- C. The PUMP CONTROL System Supplier will also be the PUMP CONTROL System Installer and will designate an experienced employee as the Systems Integrator. The Systems Integrator will be responsible for all planning, field planning, submittals, proposals, on site coordination, installation, proper programming and operation of the telemetry equipment, all callbacks, all warranty items and training of the owners employee’s on the system operation and all field programmable system parameters. The Systems Integrator will be the sole contact for the Owner, General Contractor and the Project Engineer. After commencement of the PUMP CONTROL installation, the Systems Integrator will be required to be on site at least 1 day (8 hours) per week and will provide the Project Engineer with at least 24 hours notice of the scheduled site visit.
- D. The PUMP CONTROL Systems Supplier will be required to be located within 50 miles of the site and be able to provide onsite assistant within 4 hours if required in the event of an emergency.
- E. Warranty: The PUMP CONTROL Systems Supplier will provide a complete labor, mileage and parts replacement warranty for one year after final acceptance of the work for all equipment provided by the PUMP CONTROL System Supplier.
- F. The PUMP CONTROL System Integrator must be a UL-508A certified panel shop at the time of Bid.

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1.04 PERFORMANCE REQUIREMENTS

- A. The PUMP CONTROL System Supplier, through the Systems Integrator, shall have total responsibility for the performance and compatibility of the entire PUMP CONTROL system as shown on the Drawings and as specified herein. The PUMP CONTROL supplier shall have sole responsibility for the quality and proper functioning all of components shown on the Drawings, as specified herein, and as specified in Section 11700 "Instrumentation Equipment" including those not of the supplier's manufacture.

1.05 Submittals

A. Shop Drawings

1. The PUMP CONTROL System supplier shall submit detailed shop drawings, complete information on all components, theory of operation, evidence of chemical compatibility, equipment piping and valve layouts, and detailed electrical wiring and PUMP CONTROL diagrams.
2. All submittals shall be sufficient in detail to demonstrate that the supplier will furnish the equipment in accordance with the Contract Documents and that the equipment is satisfactory for its intended use. The Contractor shall submit a complete list of parts and supplies for each different item of equipment installed, and a list of parts and supplies that are recommended by the manufacturer to assure efficient operation of the equipment.
3. As a minimum, submit the following documentation with the shop drawings:
 - a. Physical description of all hardware.
 - b. Functional description of all hardware and programming.
 - c. Theory of operation.
 - d. Operating procedures.
 - e. Listing of programming used.
 - f. Internal wiring diagrams for each panel, numbered wire, numbered terminal on the instrument and numbered terminal block. This includes both new panels and upgrades to existing panels.
 - g. Complete, and in every detail, interconnection wiring diagram and process and instrumentation diagrams (loop diagrams) in accordance with ISAS5.4 Instrument Loop Diagrams, Illustration 7.4, latest revision, showing all field and panel mounted equipment and terminal identification. Use the same component identification as shown on the drawings and indicated herein where possible.
 - h. List of all inputs and outputs for each PLC.
4. Prior to the Instrumentation and PUMP CONTROL System Supplier starting work on the PUMP CONTROL system, a meeting shall be held with the General Contractor, the Electrical Contractor, the PUMP CONTROL System Supplier, the Engineer, and the Owner. The purpose of the meeting will be to resolve all issues regarding system architecture, PUMP

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CONTROL loop functions, and PUMP CONTROL functions. This meeting typically takes one day and should be scheduled as soon as reasonably possible after the award of the contract (typically 30 days). The PUMP CONTROL System Supplier is expected to have his project team in place prior to the meeting and all relevant members of that team shall be in attendance at the meeting.

- B. Operation and Maintenance Manual - The Contractor shall furnish (3) copies of complete operation and maintenance manuals for the treatment modules including part schedules to assist in assembly, disassembly, and ordering parts. Specific operation and maintenance instructions shall be prepared for the entire system by the PUMP CONTROL System Supplier. Operation and maintenance instructions for individual components should be included with the package; however, written instructions, drawings, and schematics must cover the complete system, not just specific components.
- C. Software Application - The Contractor shall furnish two copies of the software application with licensing for each type of PLC and OIT used.

PART 2 PRODUCTS

2.01 PROCESS EQUIPMENT

See Section 11700 "Instrumentation Equipment"

2.02 SYSTEM PUMP CONTROL

- A. The Control system vendor shall furnish all components to the PUMP CONTROL system providing all necessary control functions for totally integrated operation of the pump process and pump stations. The controls shall be as described hereafter.
- B. Control Panels
 - 1. The control panel is existing. The integrator shall be responsible for adding the functionality of this spec to the existing hardware.
 - 2. Provide Qty 6 - 3A, 120VAC breakers for motor heater circuits.
 - 3. Provide coordination and support for interfacing motor heaters and VFD's as required.
 - 4. All VFD panels shall include H-O-A selector switches, local/remote switches, float/normal switches, start stop buttons and run and fail pilot lights, elapsed time meters mounted in the door for each piece of equipment.
- C. Programmable Logic Controller

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1. The PLC is existing and is a Schneider Electric Modicon M340.
 - A. The PLC was programmed with Controls Expert. The integrator for this project will need to write a new program and load it onto the existing hardware.
2. System logic will monitor and control all components to the pump station process as shown on the Drawings and in this specification.
 - A. The Operator Interface Terminal (OIT) was developed with Vijeo designer. The integrator for this project shall develop new screens and load them onto the existing OIT.
 - B. Additional IO Points and Programming shall be added as required by the IO list and the PUMP CONTROL strategies.

D. Automatic System Operation – Saw Mill Pump Station

1. Automatic system operation shall be based on alarm, pump control levels, gas detection, fire and smoke detection, etc. and displayed on the operator work station (HMI) and operator interface terminal (OIT) in desired engineering units (ft, gpm, %, etc.) as follows:
 - a. Saw Mill Pumps
 1. Influent Flow Meter
 2. Influent Channel High Level Float
 3. Wet Well Level Input #1
 4. Wet Well High Level Float
 5. Dry Well Sump High Level Float
 6. Wet Well Level Input #2
 7. Low Level Alarm Float
 8. Wet Well Exhaust Fan
 9. Dry Well Flood Float
 10. Pump Station Effluent Pressure
 11. Effluent Pump #1 HOA status
 12. Effluent Pump #1 start
 13. Effluent Pump #1 running
 14. Effluent Pump #1 general fault alarm
 15. Effluent Pump #1 speed out
 16. Effluent Pump #1 speed in
 17. Effluent Pump #1 discharge press
 18. Effluent Pump #1 Seal Fail
 19. Effluent Pump #1 Over Temp
 20. Effluent Pump #2 HOA status
 21. Effluent Pump #2 start
 22. Effluent Pump #2 running
 23. Effluent Pump #2 general fault alarm

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24. Effluent Pump #2 speed out
25. Effluent Pump #2 speed in
26. Effluent Pump #2 discharge press
27. Effluent Pump #2 Seal Fail
28. Effluent Pump #2 Over Temp
29. Effluent Pump #3 HOA status
30. Effluent Pump #3 start
31. Effluent Pump #3 running
32. Effluent Pump #3 general fault alarm
33. Effluent Pump #3 speed out
34. Effluent Pump #3 speed in
35. Effluent Pump #3 discharge press
36. Effluent Pump #3 Seal Fail
37. Effluent Pump #3 Over Temp
38. Effluent Pump #4 HOA status
39. Effluent Pump #4 start
40. Effluent Pump #4 running
41. Effluent Pump #4 general fault alarm
42. Effluent Pump #4 speed out
43. Effluent Pump #4 speed in
44. Effluent Pump #4 discharge press
45. Effluent Pump #4 Seal Fail
46. Effluent Pump #4 Over Temp
47. Pump Station Effluent A Flow Rate
48. Effluent Flow A totalizer
49. Pump Station Effluent B Flow Rate
50. Effluent Flow B totalizer
51. Pump Station Level
52. High Level Float
53. Low Level Float
54. Exhaust Fan Disable

b. Storm Flow Pumps

1. Storm Water Pump #1 HOA status
2. Storm Water Pump #1 start
3. Storm Water Pump #1 running
4. Storm Water Pump #1 general fault alarm
5. Storm Water Pump #1 speed out
6. Storm Water Pump #1 speed in
7. Storm Water Pump #1 discharge press
8. Storm Water Pump #1 Seal Fail
9. Storm Water Pump #1 Over Temp
10. Storm Water Pump #2 HOA status
11. Storm Water Pump #2 start
12. Storm Water Pump #2 running

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13. Storm Water Pump #2 general fault alarm
 14. Storm Water Pump #2 speed out
 15. Storm Water Pump #2 speed in
 16. Storm Water Pump #2 discharge press
 17. Storm Water Pump #2 Seal Fail
 18. Storm Water Pump #2 Over Temp
 19. Storm Water Flow Rate
 20. Storm Water Flow totalizer
- c. Saw Mill Valves
1. Valve #1 Opened 10%
 2. Valve #1 Closed
 3. Valve #2 Opened 10%
 4. Valve #2 Closed
 5. Valve #3 Opened 10%
 6. Valve #3 Closed
 7. Valve #4 Opened 10%
 8. Valve #4 Closed
 9. Valve #5 Opened 10%
 10. Valve #5 Closed
 11. Valve #6 Opened 10%
 12. Valve #6 Closed
- d. Grinders
1. Grinder #1 Run Status
 2. Grinder #1 Fault
 3. Grinder #2 Start
 4. Grinder #2 Run Status
- e. Wetwell Blowers
1. Wetwell Blower#1 Start
 2. Wetwell Blower#1 Run Status
 3. Wetwell Blower#1 Fault
 4. Wetwell Blower#1 Speed Out
 5. Wetwell Blower #1 Speed In
 6. Wetwell Blower#2 Start
 7. Wetwell Blower#2 Run Status
 8. Wetwell Blower#2 Fault
 9. Wetwell Blower#2 Speed Out
 10. Wetwell Blower #2 Speed In
- f. Fire & Intrusion Detection
1. Fire Detection Alarm input
 2. Intrusion Detection Alarm input

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- g. General Pump Station Info
 - 1. Low Fuel Storage
 - 2. Generator Running
 - 3. Generator Fault
 - 4. Commercial Power Failure
 - 5. Hi Water Alarm In Wetwell
 - 6. Temperature Switch
 - 7. Unauthorized Entry
 - 8. Flood Alarm
 - 9. ATS Failed to Transfer
 - 10. On Backup Power
 - 11. ATS General Fault
 - 12. Generator Failed to Start
 - 13. Generator Low Battery

E. Managed Ethernet Switch – The Ethernet Switch shall be a Hirschman or Engineer Approved Equal.

1. General

- a. The PLCs shall be connected to the PUMP CONTROL network backbone through a 10/100 Industrial Rail Ethernet Switch. The Switch shall support fault tolerant ring architecture and shall provide full duplex capability and redundant power. 10/100 Industrial Rail Ethernet Switch shall provide five or more 10/100 Fast Ethernet ports, plus one standby port via RJ45 interfaces and one V.24 interface for external management. Two uplink ports shall be provided for integrated connectivity to the fault tolerant Network backbone. Depending upon the fiber used the uplink ports will be Cat 6 cable or multimode fiber with ST connectors.
- b. Fiber shall be 6 stranded with ST connectors installed and test reports given to the client.

2. Frame Switching Functions

- a. All data received by the switch from the system bus or at the ports shall be stored and checked for validity. Invalid and defective frames as well as fragments shall be discarded. The switch shall forward valid frames.
- b. The switch shall learn all source addresses per port. Only packets with: unknown addresses, this address or a multi/broadcast address in the destination address shall be sent to this port. The switch shall be capable of learning two thousand (2,000) addresses.

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- c. The Switch shall monitor the age of the learned addresses. The Switch shall delete address entries from the data table that exceed a certain age.
- d. The Switch shall support two priority queues. The classification of received data packets to these classes shall be done by: the pre-defined classification in statistical address entries and the priority of the data packet included in the VLAN packet.
- e. On data packets with VLAN tags the switch shall analyze the 3 bit priority field. Data packets with VLAN tags and a maximum long data field shall be transmitted. Data packets received without VLAN tags shall be transmitted without VLAN tags.

3. Specific Functions of the TP/TX Interface

- a. The Switch shall monitor the connected TP/TX line segments for short circuit or interrupt using regular link test pulses in accordance with IEE standard 802.3 10/100BASE-TX. The Switch shall not transmit any data in a TP/TX segment from which it does not receive a link test pulse.
- b. If the reception line pair is incorrectly connected (RD+ and RD- switched) polarity shall be automatically reversed.
- c. 8 Port minimum.

4. Self-Healing Functions

- a. The Switches shall allow the backbone to assimilate a ring architecture. If one does switch fails or the backbone cable is cut, the ring structure shall change itself into a line structure within 0.5 seconds with up to 50 Switches on the network.

5. Voltage Supply

- a. The voltage supply shall be redundant 24 VDC power supplies

6. Management

- a. The Switch shall support SNMP and Web-based management for extensive diagnosis and configuration functions to allow easy startup procedures and allow network and device information. The Switch shall support TCP/IP protocol family.

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7. Technical Specifications

- a. Operating Voltage – 24 VDC -25%, +33%
- b. Current Consumption – 0.8 A max. at 24 VDC
- c. Overload current protection – thermal fuse
- d. Ambient temperature - 0°C to 50°C
- e. Storage Temperature - -20°C to 80°C
- f. Humidity – 10% to 90% (non-condensing)
- g. Port attenuation – 11dB at 1300nm

8. Rail Switch shall be newest RS20 switches by Hirschmann.

2.03 PUMP CONTROL STRATEGIES

1. The following PUMP CONTROL strategies describing the operations of each PUMP CONTROL loop indicated on the Drawings will be considered the essence of the specifications. Furnish and install all necessary equipment, instruments, software modules and appurtenances to achieve the performance as hereinafter described, even though such items may not be included in any specific listing of equipment to be furnished. An involved system of this nature requires emphasis on the functional aspects of the Specifications while the technical details serve to indicate the desired manner in which the end result will be accomplished. The control and monitoring strategies indicated below are for equipment external to any existing or proposed packaged process equipment. Control strategies for the packaged process equipment shall be as described in other parts of this specification and as required for proper operation of the system. The following control strategies are associated with the pump stations indicated below:

A. Saw Mill Pump Station

1. Effluent Pumps

- a. The 4 effluent pumps shall be operated automatically from the Pump Control Panel based on level in the wetwell. Pumps #1, #2, #3 and #4 shall operate in a lead, lag, lag-lag format. When in auto the liquid level in the wetwell shall be sensed by a set

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of redundant pressure transducers. When the level rises above an operator adjustable lead pump on setpoint the lead pump shall come on and pace to maintain the level in the wetwell. The pump control panel shall operate the pump continuously over the speed range from a required minimum to a maximum of not less than 100% of pump full load speed. If the level in the wetwell drops and the pump is ramped down to the minimum speed of 75% the pump control panel shall lock the speed at 75% until the pump is either shutoff or the level rises and the speed is increased. If the level in the wetwell drops below the user defined lead pump off setpoint the pump control panel shall shut the lead pump off and rotate the pump to the lag-lag pump in the order.

If the level in the wetwell continues to rise and climbs above the operator adjustable lag pump on setpoint the lead pump shall ramp down to the pump minimum speed of 75% and the lag pump shall start at the pumps minimum speed of 75% and they shall both ramp up together to maintain a level in the wetwell. If the level in the wetwell drops below the lag pump off setpoint control panel shall shutoff the lag pump and continue to operate the lead pump to maintain the level in the wetwell. If the level continues to drop and goes below the lead pump off setpoint the control panel shall shutoff the lead pump and rotate it to the lag-lag pump in the order. There will also be a lag-lag pump on set-point, and the control system shall ramp the lead and lag pump down to 75% , start the lag-lag pump at 75% and ramp up together to maintain a level in the wet well. The lag pump shall be rotated to the lead pump and the lag-lag pump shall be rotated to the lag pump. If the level rises above the high level setpoint operate the lead, lag, and lag-lag pumps at 100% and alarm the operator. No more than three (3) pumps will be on at one time. Once the level drops below the high level setpoint resume normal operation.

At any time when a pump is either called to run, or shutdown, the pump shall do so over a 20 second ramp or deceleration time. All level set points shall be operator adjustable via the control panel OIT.

If the level drops below the low level setpoint lockout all pumps and alarm the operator. Upon the level rising above the low level setpoint the controls shall be reset and pump lockouts removed.

If the level decreases and activates the pump off float any and all pumps shall be ramped down to off over a 30 sec period. If the low level float is activated the pump control panel shall initiate an alarm and ensure all pumps are off. The lead pump shall be rotated to the lag-lag pump, the lag pump shall be rotated to the lead pump and the lag-lag pump shall be rotated to the lag pump.

When in auto if there is no flow sensed through the flow meter and a pump is running after an operator defined amount of time the control panel shall alarm the operator, shutoff the pump and rotate the lead lag order.

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When in hand the pumps shall start and stop by pressing buttons on the VFD for the pump.

- b. **PUMP CONTROL PANEL:** The pump control panel shall indicate the pump HOA status, run status, speed, and fault for each pump, wetwell level, backup float status, backup float switch position. The pump control panel shall initiate an alarm upon a pump failure. The pump control panel shall also display and record the elapsed run time for each pump. The pump control panel shall accept and display each of the above status and alarm conditions. The pump control panel supplier is also responsible for controlling and monitoring the following: “pump running”, “general fault”, “low level fault”, and “hi level float”.

2. Storm Flow Pumps

- a. The 2 storm water pumps shall be operated automatically from the Pump Control Panel based on high level in the wetwell. Pumps #1, and #2, shall operate in a lead, lag format. When in auto the liquid level in the wetwell shall be sensed by a set of redundant pressure transducers. When the level rises above an operator adjustable high level setpoint the lead pump shall come on and pace to maintain the level in the wetwell. The pump control panel shall operate the pump continuously over the speed range from a required minimum to a maximum of not less than 100% of pump full load speed. If the level in the wetwell drops and the pump is ramped down to the minimum speed of 75% the pump control panel shall lock the speed at 75% until the pump is either shutoff or the level rises and the speed is increased. If the level in the wetwell drops below the user defined lead storm pump off setpoint the pump control panel shall shut the lead pump off and rotate the pump to the lag pump in the order.

3. Valves

The Pump Station Control Panel will monitor the position of the swing style check valve. Upon a pump start, the control panel will monitor the position of the check valve. Should the check valve not open and remain on the closed limit switch after an operator settable amount of time the control system shall stop the pump and start the next pump in the lead-lag sequence. Once the wet well level reaches the pump off set point the pump will begin to ramp down, the control system shall monitor the 10% closed limit switch and continue to ramp the pump down until the 10% limit switch is satisfied. Once satisfied the pump shall shut down.

- a. **PUMP CONTROL PANEL:** The pump control panel shall indicate the valve status and press switch status for each pump. The pump control panel shall initiate an alarm upon a valve failure to open off of closed position. The pump control panel shall accept and display each of the above status and alarm conditions.

3. Level Pressure Transducers

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PUMP STATION CONTROL SYSTEM

The Saw Mill Pump station will run off of the average of the two level transducers. The control panel should monitor the separate transducers and trend the level of both. Should the either level transducer deviate 5% or more than the other, the control panel shall send an alarm "Calibrate Transducer X" and operate the station off of only the transducer that has not been alarmed.

PUMP CONTROL PANEL: The pump control panel shall indicate the wet well level and transducer fault status. The pump control panel shall initiate an alarm upon level deviation. The pump control panel shall accept and display each of the above status and alarm conditions.

4. Wetwell Blowers

- a. The proposed wetwell blowers shall be operated automatically from the Pump Control Panel based on an operator preset blower speed and an operator preset timer within the Pump Control Panel. Blower#1 shall be dedicated to Wetwell #1 and Blower #2 shall be dedicated to wetwell#2. Upon the selection of the "auto" mode at the HMI and at the blower VFD, the Pump Control Panel shall start the wetwell blower to pace to maintain an operator preset blower speed. The Pump Control Panel shall also provide an operator preset timer which allows the operator to set a run cycle of the blower. In the event of a blower motor high temperature alarm, a blower discharge high temperature alarm or a blower general fault alarm, the Pump Control Panel shall cease operation of the blower and initiate an alarm and start the backup blower.
- b. WWCS : The WWCS shall indicate and display the operation status for the blower, including timer status and blower speed setpoint, HOA status, blower running status, general fault, % speed, motor high temperature alarm, blower discharge high temperature alarm and blower run times. The WWCS shall accept and display each of the above status and alarm conditions.

5. Building Alarms

- a. The building alarms shall be monitored and used for control and alarm. The following shall be monitored and displayed: low fuel storage, low city water press, generator cp contact#1, generator cp contact #2, commercial power failure, hi water alarm in wetwell, fire or smoke alarm, temperature switch, unauthorized entry, and flood alarm. The listed alarms shall send a signal from the pump station control panel to SCADA and the alarm panel to notify the operators.
- b. PUMP CONTROL PANEL: The pump control panel shall indicate the fire detection alarm status and exhaust fan interlock status. The pump control panel shall initiate an alarm upon fire detection. The pump control panel shall accept and display each of the above status and alarm conditions.

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- B. All analog inputs shall be available for trending.
 - C. The Pump Station Control supplier shall assume 100 display screens at pump station and a total of unlimited display screens at the WWTP will be required for this project. The exact configuration and content of each display will be determined during the kick-off meeting and shop drawing review.
 - D. In addition the Pump Station Control supplier shall provide the reports in excel reporter that are currently in use at the Mohawk View Waste Water Treatment Plant plus 10% additional reports that will be required for this project. The exact configuration and content of each report will be determined during the kick-off meeting and shop drawing review.
 - E. Furnish software for the operator workstation which shall generate data, graphics, reports, alarms, journaling, historical replay, and trending and shall provide data acquisition and operator graphics. Furnish a run-time system which will execute the data collection system and shall provide a graphic operator interface.
1. Operator workstation multitasking : Furnish a software operating system that provides multitasking which allows the operator workstation to perform multiple tasks in apparently, a simultaneous manner.
 2. Language Compiler: Furnish a software language compiler which provides a programming facility for creation of display and report formats and allows access to signal values from the Real-Time Data Base, Static and Historic Data Bases. Furnish with the operator workstation software a full-screen editor that can be used to create and modify displays, reports and application software.
 3. System Configurator: Furnish an operator workstation software system configurator which uses a menu-driven, fill-in-the-blanks method to configure or modify the system databases and lists. No programming knowledge shall be required. Furnish the data base stored on floppy diskettes. Include the following data bases and list utilities:
 - a. Polling list
 - b. Static data base
 - c. Real-Time data base
 - d. Remote list tables
 - e. Display data lists
 - f. Node routing table
 - g. Historic data list
 4. Operator Display System: Furnish a display system which along with the keyboard shall be the primary interface to the Pump Station Control system. Furnish the display system that presents to the operator with current operating status in alpha-numeric or mimic form and allows the operator to modify network parameters and change the status. Furnish the system designed to allow the operator to display and signal and to change set points, turn field devices on or off, and open or close valves. Furnish the system to allow the operator to call up any display with a

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mouse pointing device. In addition to displays required to access, to program, and to perform diagnostics, the five graphical displays shall include:

- a. All alarm points
 - b. Alarm history
 - c. Equipment status display for all equipment which sends a status signal to the Pump Station Control System,
 - d. Running times of all major equipment.
 - e. Status of startup and shutdown requirements.
 - f. Status of startup and shutdown cycle.
 - g. Group displays for the following:
 1. Indicators for flow rates.
 2. Indicators for all analyzers.
 3. Numeric display for all totalizers.
 4. Indicators for wet well levels.
 - h. Flow schematic for each treatment process showing events of the startup and shutdown programs and operating parameters.
5. System Trend Display: Furnish a dedicated real-time display system with an internal data storage buffer which shall allow up to 40 variables to be trended simultaneously. Furnish a system which shall display any five trends in one minute, six minute or an operator-defined time frame. Furnish a data zoom which shall automatically re-compute the scale. Furnish the historic trend displays for each parameter shown on the Drawings. In addition, furnish a trend display for summation of the well flow meters.
6. X, Y Plot: Furnish a system to plot any one parameter versus four parameters in a real-time X, Y plot. The system shall allow any 40 trended variables to be plotted.
7. Trend Windows: Furnish a system capable of displaying a trend window on another display. Each trend window shall contain up to three parameters. The time frame of the window shall be operator-defined ranging from 0.5 minutes to 24 hours.
8. Report System: Furnish a report system which allows both demand reports and scheduled reports to be printed on the line printer. Accumulation of data may be accomplished at Main SCADA Room. Demand logs shall normally depict instantaneous values and shall be invoked through a Report Select Menu. Scheduled reports shall be printed daily, monthly and yearly and shall depict accumulated information over an interval.
9. Alarm System: Furnish a comprehensive alarm system including both logical and analog alarms grouped into four priority classes; critical, non-critical, operator guide and event. Time stamped state and change-of-state alarms for logical signals and high, high-high, low, low-low, set point deviation and rate-of-change alarms for analog signals shall be displayed on the CRT. In addition, all alarms shall be recorded in an alarm history file and presented in an alarm history display. Furnish an audible alarm with audible silence and alarm acknowledge function keys. Acknowledged, unacknowledged and return-to-normal alarm conditions shall be differentiated by color on the CRT. Using the printer dedicated for alarms, all alarms shall

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be printed to provide a hard copy historical path. The OWNER will designate the priority of each alarm during review of shop drawings.

10. Event Driven Historian: Furnish a journal file to record all significant events reported or initiated by the operator workstation. A significant event is defined as any action which directly affects the network, e.g. sign on, sign off and signal value changes. All events shall be stored with a time/date stamp. Data shall be logged to a minimum of 14 different files. Each file shall be capable of accepting 20 points. The system shall be able to log data at two rate.
11. Shift Historian: Furnish data base to file historic data. The system shall provide on-line data reduction for up to 23 variables, shall scan the selected variables every ten seconds and shall store a three sample average value in an hourly file every 30 seconds. The hourly files shall be averaged in shift file. This process shall be repeated for daily and weekly files. Each file shall contain 120 time-stamped records for each variable.
12. Historical Replay: Furnish an on-line historical replay to allow the operator to review historical files created by the Event and Shift Historian; to permit the operator to recover historical data from a floppy disk or flexible disc; to generate monthly and yearly reports if the system storage is not adequate. Furnish a system which shall replay data in a tabular or graphical format. The entire software system shall maintain full operation during historical replay.
 - a. Furnish a spreadsheet, tabular replay display to permit simultaneous viewing of up to eight variables. The tabular replay shall allow the operator to scroll up and down through the file in groups of 18 records and scroll sideways in groups of eight variables.
 - b. Furnish graphical relay displays in trend style display which shall graph up to five variables at a time. From the keyboard the operator shall be able to scroll through the file forward and backward. By using a cursor the operator shall be able to move across the graph to display the time and value of each sample in the file.
13. Security System: Furnish a security system to ensure that access is restricted to authorized personnel through the sign-on procedure by assigning user identification and password protection. Furnish the system so that once signed-on, the operator may set the system time and date through a menu display. Four levels of access to system functions shall be provided.
14. Timekeeping System: Furnish a five-year, battery backed up real-time calendar clock with the operator workstation which automatically updated the software clocks upon power up. Furnish the system so that the operator can set the date and time and set the software clocks via a menu display. Furnish the system to synchronize the entire system.
15. Interactive Compiler: Furnish a menu-driven program for configuring SCADA schemes. Furnish fill-in-the-blanks screen displays to enable an operator to create and edit tasks, perform linking and downloading operations, and provide self-documentation. Furnish the

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PUMP STATION CONTROL SYSTEM

compiler to allow on-line modification of the controller load files.

16. Diagnostic Program: Furnish an on-line system diagnostic program that runs the Portable Engineer Interface computer and permits the user to view and edit aspects of a system while the system performs its normal task.

2.04 POWER SUPPLIES

- A. Furnish power supplies located in the PLC cabinets of the d-c solid state type, designed for 2 and 4 wire transmitter loops where integrals instrument power supplies are not provided. Furnish power supplies suitable for use up to 15 instrument loops and designed for 4-20 mAdc current signals.

2.05 SPARE PARTS AND EQUIPMENT

- A. Furnish the following spare parts and equipment and store as directed:
 1. One of each type of plug-in, process I/O board for PLC.
 2. 5 spares for lights, fuses, or other consumable items.
 3. One Spare CPU with the Pump Station Control program pre-loaded.

2.06 TOOLS

- A. Furnish a complete set of special tools required for the maintenance and operation of this equipment, as designed by the equipment manufacturer.

2.07 SHOP PAINTING

- A. Furnish equipment with a complete manufacturer's standard corrosion resistant finish at the point of manufacturer. Engage the instrumentation supplier to provide adequate paint for repainting any areas damaged during delivery, storage or installation.

2.08 SHOP TESTING THE PUMP CONTROL SYSTEM

- A. Prior to shipment of the new PUMP CONTROL system, factory test all elements of the system, both hardware and software to demonstrate that the total system satisfies all of the requirements of this Specification.
- B. Furnish all special testing materials and equipment. Where it is not practical to test with real process variables, provide suitable means of simulation. These simulation techniques shall be subject to the approval of the Engineer.

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- C. Testing shall not be considered complete until all tests and test documentation has been completed, reviewed, and approved by the Engineer. Tests shall generally conform to the applicable sections of ISA-RP55.1. Demonstrate that all equipment conforms to these Specifications by submitting test results for similar units.
- D. Coordinate all of the testing with all other associated suppliers and with the Owner, as specified. Notify the Engineer at least four weeks prior to start of test.
- E. As a minimum, test the System at the factory with simulated inputs and outputs. Exercise all components and test all functions over their entire range. During the test, operate the system long enough to demonstrate that it is capable of continuous operation.
- F. Submit a minimum of six copies of the results of the factory tests to the Engineer for review.
- G. In the event that the conditions specified are not met or if the test is deemed unsatisfactory for other reasons, correct the fault and retest the entire system until the tests are satisfactory to the Owner all at no additional cost to the Owner.
- H. The Owner may elect to have up to three of his authorized representatives present to witness the tests. The Owner's authorized representatives will have access to all parts of the equipment, apparatus and test instruments and will have the right to check any or all readings, calibrations, or any factor necessary to determine whether or not the performances are in accordance with the Specifications.
- I. The Owner reserves the right to waive the presence of any or all of his representatives at any or all witness tests. This right of waiver does not release the manufacturer from performing the required tests.

2.09 ELECTRICAL REQUIREMENTS

- A. The power service to the PLC PUMP CONTROL Panels shall be 30Amps, 120vac, 60 hz, single phase from the UPS provided under this section.

PART 3 EXECUTION

3.01 INSTALLATION

- A. The PUMP CONTROL System supplier shall be responsible install all equipment in accordance with the Drawings and manufacturer's recommendations or as directed by the Engineer.

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3.02 SAW MILL PUMP STATION STARTUP AND OPERATOR TRAINING

- A. The PUMP CONTROL supplier shall provide field tests of all the equipment specified to demonstrate compliance with all requirements for complete and ready for operation of all equipment. Final acceptance of the PUMP CONTROL system will be made after complete system testing in the field is complete and the treatment system has operated for 2 weeks.
- B. The PUMP CONTROL system supplier shall provide a minimum of thirty (30) work days of onsite service for plant startup. Training shall be conducted by a factory trained plant operator employed by the manufacturer, and shall include all PUMP CONTROL components.
- C. The PUMP CONTROL system supplier shall also provide a minimum of five (15) work days of onsite operator training. Training shall be conducted by a factory trained plant operator employed by the manufacturer, and shall include all PUMP CONTROL components.

3.03 FIELD ACCEPTANCE TESTING FOR PUMP CONTROL SYSTEM

- A. The objective of these tests is to demonstrate that the PUMP CONTROL System is operating and complying with the specified performance requirements.
- B. Perform witnessed Functional Acceptance Tests on the complete system. Demonstrate each function to the satisfaction of the Engineer and the Owner on a paragraph-by paragraph basis.
- C. Each test shall be witnessed and signed off by both the Contractor and the Engineer upon satisfactory completion.
- D. Conduct the actual testing program with prior approved procedures and documentation.
- E. For each test description include the following minimum information:
 - 1. Spec page and paragraph of function or loop demonstrated.
 - 2. Description of function or PUMP CONTROL strategy and test to demonstrate it.
 - 3. Space for sign off and date by the Contractor, the Engineer, and the Owner.
- F. After receipt of approval by the Engineer of the documentation and the test procedures and forms, set a date to start the test.

3.04 DEFINITION OF ACCEPTANCE

SECTION 15020
NON-LUBRICATED PLUG VALVES

PART 1. GENERAL

1.0 Work Specified

- A. Non-lubricated plug valves to be installed where specified or shown on the Contract Drawings.
- B. Non-lubricated plug valves shall be installed unless otherwise specified or shown.

1.2 Related Work Specified Elsewhere

- A. Pipeline Installation:
- B. Leakage Tests:
- C. Chlorination:

1.3 Applicable Codes, Standards and Specifications

- A. American Water Works Association (AWWA)

1.4 Submittals

- A. Shop Drawings
 - 1. Prior to obtaining any equipment in connection with this section, the Contractor shall submit detailed drawings and descriptions of all valves.
 - 2. Submit a materials list and complete parts list.
- B. Affidavit of Compliance
 - 1. Submit the manufacturer's affidavit stating the valves comply with all applicable provisions of AWWA C 500.

PART 2. PRODUCTS

2.1 DESIGN

- A. Rectangular port non-lubricated plug valves shall be of the eccentric plug type suitable for sewage and sludge applications. They shall be designed for a working pressure of at least 150 PSI of water, oil or gas.
- B. The valves shall have indicators for plug position and flow arrows for indicating normal flow direction.
- C. The valves shall be designed so that the plug makes contact with the seat only.
- D. Port area shall be at least 100% of the connected pipe size.
- E. All plug valves furnished under one contract shall be the product of one manufacturer.
- F. Valves shall be capable of providing drip-tight shut off to the full valve rating with the pressure in either direction.

2.2 VALVE CONSTRUCTION

- A. Valve bodies shall be corrosion-resistant cast iron.
- B. Bearings shall be 316 stainless steel, permanently lubricated in top and bottom journals.
- C. Valve plug shall have a hycar resilient facing or be of corrosion resistant nickel-iron alloy suitable for sludge or gas service.
- D. Packing shall be adjustable packing rings, field replaceable under pressure without valve disassembly on 4 inch size or larger.
- E. Ni-resist shall be in accordance with ASTM Specification A-436-63, Type 2.
- F. Stainless steel shall be in accordance with ASTM Specification A296-65a, Grade CF-8M.

SECTION 15020
NON-LUBRICATED PLUG VALVES

- G. Valve seats shall be 50% nickel inlay welded in place.
- H. Valve bodies in sizes 3-inches and larger shall have the bodies with flanged ends, drilled to the ASA Class 125 standard, unless otherwise specified or shown. Flange connections for exposed valves. Buried valves shall have MJ connection.

2.3 EXPOSED VALVE OPERATORS

- A. All valves 6-inches in size and smaller shall be wrench operated unless otherwise specified.
- B. Manually operated valves larger than 6-inches shall be worm gear (operated with handwheels in exposed areas) and shall have a gear ratio of not less than 3:1.
- C. Valves located more than 5 feet above the floor shall be equipped with chain actuators.

2.4 BURIED VALVE OPERATORS

- A. Valves shown and valves installed in the ground with the operating nut greater than 6 feet below the finished grade shall have extension stems.
- B. Valves in the ground shall have the items extended to within 5 feet of the finished grade.
- C. A centering device shall be placed on the extension stem just below the extended operating nut.
- D. Valves Boxes
 - 1. Valves installed in the ground shall be equipped with valve boxes of the adjustable type with a barrel not less than five inches in diameter and with a base to fit the valve on which it is to be installed.
 - 2. The direction of opening of the valve shall be indicated by means of an arrow on the valve box cover. Where applicable the word "Sewer" shall also be cast in the cover.
- E. All buried valves shall have MJ connection and shall be rated for burial.

2.4 SHOP PAINTING

- A. Rust resisting primer shall be applied to the valve body. Metal surfaces shall be dry, free from rust, scale or grease.
- B. Machined surfaces shall be suitably protected from rust or corrosion.
- C. All exposed piping shall be finished in accordance with Section 02615 and Section 09910.

PART 3. EXECUTION

- A. Non-lubricated plug valves shall be installed as shown, specified and directed. They shall be tested in place under the service conditions for which they are intended and any defects revealed in the valves or connections shall be corrected.

END OF SECTION

SECTION 15030
CHECK VALVES THREE INCHES AND LARGER

PART 1. GENERAL

- 1.0 Work Specified
 - A. Swing, tilting disc and wafer check valves, three inches and larger, to be installed where specified or shown on the Contract Drawings.
 - B. Swing check valves shall be installed unless otherwise specified or shown.
- 1.1 Related Work Specified Elsewhere
 - A. Pipeline Installation:
 - B. Stainless Steel Piping
 - C. Welded Steel Piping
 - D. Ductile Iron Pipe
 - B. Leakage Tests:
- 1.2 Applicable Codes, Standards and Specifications
 - A. American Water Works Association (AWWA)
 - B. American Society of Mechanical Engineers (ASME)
 - C. American Petroleum Institute (API)
- 1.3 Submittals
 - A. Shop Drawings
 - 1. Prior to obtaining any equipment in connection with this section, the Contractor shall submit detailed drawings and descriptions of all valves.
 - 2. Submit a materials list and complete parts list.
 - B. Affidavit of Compliance
 - 1. Submit the manufacturer's affidavit stating the valves comply with all applicable provisions of AWWA C508.

PART 2. PRODUCTS – SEWAGE AND WATER CHECK VALVES

2.0 VALVE CONSTRUCTION

- A. General
 - 1. All check valves shall be single disk, swing type valves.
 - 2. Swing check valves shall be iron-body, bronze-mounted in accordance with the requirements of AWWA C508.
 - 3. Tilting disc valves shall conform to manufacturer's standards with materials and construction conforming to AWWA C508 as applicable.
 - 4. Internal parts shall be replaceable without removal of the valve from the pipeline.
- B. Valve Joints
 - 1. Check valve joints shall be as scheduled or as shown on the Contract Drawings. Where the joint is not scheduled or shown, the joint shall be as required to conform to the type of pipe joint at the point of installation.
- C. Accessories
 - 1. Where shown or specified check valves shall include special levers, weights, springs, dash pots and appurtenances.

2.1 BUFFERED SWING CHECK VALVE CONSTRUCTION

SECTION 15030
CHECK VALVES THREE INCHES AND LARGER

A. Swing Check Valves with Bottom Mounted Buffer to be APCO model CVS-6000-BMB (Series 6000B) as manufactured by DeZURIK, Inc. or pre-approved equal.

1. Bottom Mounted Buffer permits free opening, but positive non-slam closure of the disc. The oil hydraulic buffer shall make contact with the disc during the final 10% of closure to control the disc until shut-off in a manner to prevent slam and water hammer. The last 10% of closure shall be externally adjustable and variable to suit operating conditions. Bottom Mounted Buffer shall be two tank design and accumulator pressure required to extend the buffer rod shall be no more than one quarter of line pressure plus 5 psi. Tanks shall be totally enclosed to external environment

Buffer Rod shall be 303 stainless steel per ASTM A582. The final closure is to be adjustable by means of a color-coded micrometer type control valve. Control valve to have a locking set screw to secure final setting.

The Oil Reservoir shall be 316 stainless steel per ASTM A240. Hydraulic hoses are to be S.A.E. certified.

Body shall be ASTM A126 Class B cast iron. End connections shall be flanged class 125/150 per ANSI B16.1. Valves 8" and larger shall have a drain plug located on the bottom of the valve.

Body Seat shall be 316 stainless steel per ASTM A276 with an O-ring seal, and locked into place with stainless screws.

Disc and Disc Arm shall be ASTM A536 ductile iron. The disc shall be attached to the disc arm with a double clevis hinge to assure self-leveling and even load distribution upon closure, minimizing seat wear. Disc shall have an independent adjustable full open disc stop. The disc arm, valve body or cover is not to be used as the disc stop. Disc seat shall be nitrile butadiene (NBR) and field replaceable without the use of special tools. Open stop shall be adjustable.

Lever and weight assembly shall be on both sides of the valve for even distribution of torsional load for sizes 18-24".

Pivot Shaft shall be a large one-piece 303 stainless steel per ASTM A582, protruding through the body with a lever and weight mounted on one side. The pivot shaft shall have an integral retainer to prevent axial shaft movement. The pivot shaft shall have O-Ring seals on both sides of the shaft. Braided type packing is not acceptable.

Limit Switches shall be Allen-Bradley 80T-DTP and shall be placed to provide full open, 10% open and closed positions. The limit switches shall be actuated via cams mounted on the valve shaft allowing field adjustment during start up. A start up technician shall provide adjustments required to ensure limit switches provide desired readings once valve is in service.

Valve parts, to include seat, shall be replaceable without removing valve from the line. Valve is to be tested by the manufacturer as a complete assembly, including the bottom buffer, per AWWA C508.

PART 3. EXECUTION

3.0 PAINTING

A. Valves to be field painted shall be shop primed with a primer compatible to the field

SECTION 15030
CHECK VALVES THREE INCHES AND LARGER

painting specified in Section 09910.

- B. Valves painted with asphalt varnish shall be coated with a minimum of one coat of Inertol "tar stop" or equal or sandblasted before additional coats are applied.

3.1 INSTALLATION

A. General

1. The installation shall be to the configuration shown on the Contract Drawings and Shop Drawings and in accordance with the manufacturer's recommendations.
2. Valves shall be supported independently from the equipment and pipeline on supports approved by the Engineer.

B. Testing

1. Upon completion of installation, the Contractor shall operate all valves to show they operate without binding or strain.
2. Any deficiencies in the valves or installation shall be corrected.

END OF SECTION

SECTION 15040
SURGE RELIEF ANGLE VALVE

PART 1. GENERAL

1.0 Work Specified

- A. To be furnished complete with operating mechanism, controls and accessories.
- B. To be installed where specified or shown on the Contract Drawings.

1.2 Related Work Specified Elsewhere

- A. Pipeline Installation:
- B. Ductile Iron Pipe
- C. Painting

1.3 Applicable Codes, Standards and Specifications

- A. American Water Works Association (AWWA)

1.4 Submittals

- A. Shop Drawings
 - 1. Prior to obtaining any equipment in connection with this section, the Contractor shall submit detailed drawings and descriptions of all valves.
 - 2. Submit a materials list and complete parts list.
 - 3. Submittal should contain a 1 year manufacturer's warranty.
- B. Affidavit of Compliance
 - 1. Submit the manufacturer's affidavit stating the valves comply with all applicable provisions of AWWA C 500.

1.5 O&M Manuals

- A. Manufacturer to provide O&M manuals with specific maintenance requirements and schedule. Manual to describe maintenance sequencing, requirements, and give a step by step process for all typical procedures

PART 2. PRODUCTS

2.1 DESIGN

- A. The valve provided must be set at 110psi set point to reach 100% ported pressure rise of less than 33 psi.

2.2 VALVE CONSTRUCTION

- A. Valve bodies shall be corrosion-resistant cast iron.
- B. Valves shall be heavily constructed cast iron body with a ductile iron cover/spacer to withstand severe shock conditions.
- C. Body Ductile Iron in accordance with ASTM Specification A-126 Gr. B, Cover/Spacer in accordance with ASTM Specification A536 Gr. 65-45-12
- D. Body Seat Ring shall be Aluminum Bronze C95200
- E. Disc Seat Buna-N Disc Seat (16", 400mm) Aluminum Bronze with Molded Buna-N Disc Steel ASTM A36.
- F. Heavy Duty Industrial Grade Hydraulic Cylinder Steel.

SECTION 15040
SURGE RELIEF ANGLE VALVE

- G. Valve to be less than 57" dimensionally in height.

2.3 EXPOSED VALVE OPERATORS

- A. Valve can be placed in any position as long as atmospheric oil reservoir is vertically installed
- B. Valves to be placed where oil reservoir and mechanisms can be serviced

2.4 SHOP PAINTING

- A. Rust resisting primer shall be applied to the valve body. Metal surfaces shall be dry, free from rust, scale or grease.
- B. Machined surfaces shall be suitably protected from rust or corrosion.
- C. All exposed piping shall be finished in accordance with Section 02615 and Section 09910.

PART 3. EXECUTION

- A. Surge Relief Angle valves shall be installed as shown, specified and directed. They shall be tested in place under the service conditions for which they are intended and any defects revealed in the valves or connections shall be corrected.
- B. Manufacturer shall supply (1) day training in field to show all maintenance requirements and describe the operation of the valve to plant employees.

END OF SECTION

SECTION 15050
MANUALLY OPERATED PINCH VALVES

PART 1. GENERAL

1.0 Work Specified

- A. Manually Operated Pinch valves to be installed where specified or shown on the Contract Drawings.
- B. Manually Operated Pinch valves shall be installed unless otherwise specified or shown.

1.2 Related Work Specified Elsewhere

- A. Pipeline Installation:
- B. Leakage Tests:
- C. Chlorination:

1.3 Applicable Codes, Standards and Specifications

- A. American Water Works Association (AWWA)

1.4 Submittals

- A. Shop Drawings
 - 1. Prior to obtaining any equipment in connection with this section, the Contractor shall submit detailed drawings and descriptions of all valves.
 - 2. Submit a materials list and complete parts list.
- B. Affidavit of Compliance
 - 1. Submit the manufacturer's affidavit stating the valves comply with all applicable provisions of AWWA C 500.

PART 2. PRODUCTS

2.1 DESIGN

- A. Valves are to be of the full cast metal body, mechanical pinch type with flange joint ends on both the body and the sleeve trim. The valve shall have face-to-face dimensions of standard gate valves, in accordance with ANSI B16.10 up to 12" size. Sizes 14" and larger shall have a face to face dimension no longer than twice the nominal valve port diameter. The flanges shall be drilled to mate with ANSI B16.1, Class 125/ANSI B16.5, and Class 150 flanges.
- B. The sleeve trim shall be one piece construction with integral flanges drilled to be retained by the flange bolts. The sleeve trim shall be reinforced with calendared nylon or calendared polyester fabric to match service conditions. The sleeve trim shall be connected to the pinch bar by tabs imbedded in the sleeve trim-reinforcing ply. All internal valve metal parts are to be completely isolated from the process fluid by the sleeve trim. To promote laminar flow. The interior surface of the sleeve shall be smooth. Sleeves manufactured with interior arches or folds shall not be permitted.
- C. For full port and reduced port sleeves, the port areas shall be 100% of the full pipe area at the valve ends. For Cone and Variable Orifice sleeves the inlet port area shall be 100% of the full pipe area, reducing to a smaller port at the outlet.
- D. The steel mechanism shall be double acting with pinching of the sleeve trim occurring equally from two sides. ACME threads shall be used on all valve mechanisms. There shall be no cast parts in the operating mechanism. To prevent pitting, corrosion, seizing or jamming. The pinching mechanism and side-rails shall be fully enclosed within the valve body. Side-rails that slide through bushings or protrude through the valve body shall not be permitted. The stem shall be non-rising and have a non-rising handwheel. The handwheel shall be constructed of welded, tubular steel and be connected to the stem by means of a single retaining bolt. The handwheel shall be fitted with a lubrication fitting to allow lubrication of the stem. A valve position indicator rod shall pass through the center of the stem, retaining bolt, and handwheel to provide visual position indication. Bevel gear operators shall be provided on all valves over 8" size. Lifting eyelets shall be provided on the top of the valve body where applicable.

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MANUALLY OPERATED PINCH VALVES

2.2 FUNCTION

- A. Rotating the handle clockwise lowers a pinch bar above the sleeve, while raising a pinch bar below the sleeve simultaneously, pinching the sleeve closed at the center of the valve. Turning the handle counter-clockwise separated the two pinch bars to open the valve.

2.3 MANUFACTURER

- A. All valves shall be of the Series 75 as manufactured by the Red Valve Co., Inc. of Carnegie, PA 15106 or approved equal.

PART 3. EXECUTION

3.1 INSTALLATION

- A. Valve shall be installed in accordance with manufacturer's written Installation and Operation Manual and approved submittals.

3.2 MANUFACTURER'S CUSTOMER SERVICE

- A. Manufacturer's authorized representative shall be available for customer service during installation and start-up, and to train personnel in the operation, maintenance and troubleshooting of the valves.
- B. Manufacturer shall also make customer service available directly from the factory in addition to authorized representatives for assistance during installation and start-up, and to train personnel in the operation, maintenance and troubleshooting of the valves.

SECTION 15070
GATES AND WEIRS

PART 1 GENERAL

1.01 SUMMARY

A. The CONTRACTOR shall furnish all labor, material, tools, supervision, transportation and installation equipment to furnish and install all flow control sluice gates, all stop logs and all downward-opening weir gates as specified herein and shown on the Drawings.

1.02 SUBMITTALS

A. Shop Drawings

Supplier shall submit six (6) sets of shop drawings. Shop drawings shall include equipment descriptions, specifications, dimensional and assembly drawings, parts lists, and job specific drawings.

B. Operation and Maintenance Manuals

Supplier shall submit three (3) sets of Operation and Maintenance manuals. The manuals shall include equipment descriptions, operating instructions, drawings, troubleshooting techniques, a recommended maintenance schedule, and the recommended lubricants.

1.03 QUALITY ASSURANCE

A. The equipment provided under this section shall be fabricated, assembled, erected, and placed in proper operating condition in full conformity with the drawings, specifications, engineering data, instructions and recommendations of the equipment manufacturer unless exceptions are noted by the engineer.

B. Gates, weirs and operators shall be supplied with all the necessary parts and accessories indicated on the drawings, specified or otherwise required for a complete, properly operating installation, and shall be the latest standard product of a manufacturer regularly engaged in the production of fabricated gates. Except as modified or supplemented herein, all gates and operators shall conform to the applicable requirements of AWWA C561, latest edition.

C. The manufacturer shall have experience in the production of substantially similar equipment, and shall show evidence of satisfactory operation in at least 30 installations. The manufacturer's shop welds, welding procedures and welders shall be qualified and certified in accordance with the requirement of the latest edition of ASME, Section IX. All gates and weirs shall be shop inspected for proper operation before shipping.

D. The manufacturer shall be ISO 9001:2000 certified.

1.04 DELIVERY, STORAGE AND HANDLING

A. The equipment shall be packaged in containers constructed for normal shipping, handling and storage.

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GATES AND WEIRS

1.06 IDENTIFICATION

- A. All electrical units shall be identified with a corrosion resistant nameplate, securely affixed in a conspicuous place. Nameplate information shall include equipment model number, serial number, supplier's name, and location.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. The physical layout of the gates and weirs as shown on the contract drawings and the equipment specified herein are based upon H. Fontaine Ltd. The use of these gates and weirs does not remove any responsibility of the CONTRACTOR to verify dimensions and elevations to ensure the equipment will fit within the existing and proposed tank configurations. The use of any "or equal" will require the manufacturer to provide a modified layout subject to the approval of the ENGINEER at no additional cost the OWNER. The gates and weirs shall be in compliance with these specifications and plans and shall be supplied by one of the following manufacturers:

- 1. RW Gate Company
- 2. Fontaine
- 3. Whipps
- 4. Waco
- 4. Approved equal

- B. If the CONTRACTOR proposes an "or equal" system, it shall be understood that the proposed gates and weirs meets or exceeds the specified performance and construction and offers a cost savings to the OWNER. The CONTRACTOR may be responsible for engineering time to review proposed substitutions and if approved, shall provide a credit to the OWNER for cost difference of the specified and approved gates and weirs

2.02 SLUICE GATES

A. DESIGN CRITERIA

- 1. LEAKAGE. Sluice gates shall be substantially watertight under the design head conditions. Under the design seating head, the leakage shall not exceed 0.05 U.S. gallon per minute per foot (0.60 l/min per meter) of seating perimeter. Under the design unseating head, the leakage for heads of 20 feet (6m) or less shall not exceed 0.1 U.S. gallon per minute per foot (1.25 l/min per meter) of perimeter. For unseating heads greater than 20 feet (6m), the allowable leakage shall not exceed the rate per foot (meter) of perimeter specified by the following equations :

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Maximum allowable leakage

Gallons per minute per foot of perimeter :

$$= 0.10 + (0.0025 \times (\text{unseating head in feet} - 20))$$

Liters per minute per meter of perimeter :

$$= 1.25 + (0.1025 \times (\text{unseating head in meters} - 6.1))$$

Example : If we have a gate with 35 feet head, the leakage for the unseating head will be :
 $0.10 + (0.0025 \times (35 - 20)) = 0.1375$ US gpm/ft of perimeter

2. **DESIGN HEAD.** The sluice gates shall be designed to withstand the design head to match channel depth. See drawings.
3. **SEAL PERFORMANCE TEST.** The gate's sealing system should have been tested through a cycle test in an abrasive environment and should show that the leakage requirements are still obtained after 25,000 cycles with a minimum deterioration.
4. **WALL SLEEVE COORDINATION.** The Contractor shall coordinate with the sluice gate supplier to ensure compatibility between all wall sleeves and openings with the flanges of the sluice gates.

B. PRODUCT

1. **GENERAL DESIGN.** Gates shall be either self-contained or non self-contained of the rising stem, configuration as indicated on the gate schedule.
2. **FRAME.** The gate frame shall be constructed of structural members or formed plate welded to form a rigid one-piece frame. The frame shall be of the flange back design suitable for mounting on a concrete wall or within a concrete channel as shown on the Contract Plans. The guide slot shall be made of UHMWPE (ultra high molecular weight polyethylene).
3. The frame configuration shall be of the flush-bottom type and shall allow the replacement of the top and side seals without removing the gate frame from the concrete.
4. **SLIDE.** The slide shall consist of a flat plate reinforced with formed plates or structural members to limit its deflection to 1/720 of the gate's span under the design head. Design head shall be the depth of the channel. See Contract Drawings.
5. **GUIDES AND SEALS.** The guides shall be made of UHMWPE (ultra high molecular weight polyethylene) and shall be of such length as to retain and support at least two thirds (2/3) of the vertical height of the slide in the fully open position.
 - a. Side and top seals shall be made of UHMWPE (ultra high molecular weight polyethylene) of the self-adjusting type. A continuous compression cord shall ensure contact between the UHMWPE guide and the gate in all positions. The sealing system shall maintain efficient sealing in any position of the slide and allow the water to flow

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- only in the opened part of the gate. J bulb, P seals or “Crown” seals are not acceptable.
- b. The bottom seal shall be made of resilient neoprene set into the bottom member of the frame and shall form a flush-bottom.
6. STEM AND COUPLINGS. The operating stem shall be of stainless steel designed to transmit in compression at least 2 times the rated output of the operating manual mechanism with a 40 lbs (178 N) effort on the crank or handwheel.
- a. The stem shall have a slenderness ratio (L/r) less than 200. The threaded portion of the stem shall have machined cut threads of the Acme type.
 - b. Where a hydraulic, pneumatic or electric operator is used, the stem design force shall not be less than 1.25 times the output thrust of the hydraulic or pneumatic cylinder with a pressure equal to the maximum working pressure of the supply, or 1.25 times the output thrust of the electric motor in the stalled condition.
 - c. For stems in more than one piece and with a diameter of $1\frac{3}{4}$ inches (45 mm) and larger, the different sections shall be joined together by solid bronze couplings. Stems with a diameter smaller than $1\frac{3}{4}$ inches (45 mm) shall be pinned to an extension tube.
 - d. The couplings shall be grooved and keyed and shall be of greater strength than the stem.
 - e. Gates having a width greater than two times their height shall be provided with two lifting mechanisms connected by a tandem shaft.
7. STEM GUIDES. Stem guides shall be fabricated from type 304L (or 316L) stainless steel. The guide shall be equipped with an UHMWPE bushing. Guides shall be adjustable and spaced in accordance with the manufacturer's recommendation. The L/r ratio shall not be greater than 200.
8. STEM COVER. Rising stem gates shall be provided with a clear polycarbonate stem cover. The stem cover shall have a cap and condensation vents and a clear mylar position indicating tape. The tape shall be field applied to the stem cover after the gate has been installed and positioned.
9. MANUAL LIFTING MECHANISM. Manual operators of the types listed in the schedule shall be provided by the gate manufacturer.
- a. All bearings and gears shall be totally enclosed in a weather tight housing. The pinion shaft of crank-operated mechanisms shall be constructed of stainless steel and supported by roller or needle bearings.
 - b. Each manual operator shall be designed to operate the gate under the maximum specified seating and unseating heads by using a maximum effort of 40 lbs (178 N) on the crank or handwheel, and shall be able to withstand, without damage, an effort of 80

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lbs (356 N).

- c. The crank shall be removable and fitted with a corrosion-resistant rotating handle. The maximum crank radius shall be 15 inches (381 mm) and the maximum handwheel diameter shall be 24 inches (610 mm).

10. MANUAL LIFTING MECHANISM WITH OPEN-CLOSED INDICATOR. Manual operators with open and closed indicators of the types listed in the schedule shall be provided by the gate manufacturer.

- a. All bearings and gears shall be totally enclosed in a weather tight housing. The pinion shaft of crank-operated mechanisms shall be constructed of stainless steel and supported by roller or needle bearings.
- b. Each manual operator shall be designed to operate the gate under the maximum specified seating and unseating heads by using a maximum effort of 40 lbs (178 N) on the crank or handwheel, and shall be able to withstand, without damage, an effort of 80 lbs (356 N).
- c. The crank shall be removable and fitted with a corrosion-resistant rotating handle. The maximum crank radius shall be 15 inches (381 mm) and the maximum handwheel diameter shall be 24 inches (610 mm).
- d. Open and Closed gate position will be indicated on the SCADA. The position of the gate shall be determined by limit switches provided by the gate manufacturer for new gates and by the General Contractor for existing gates.

11. ELECTRICALLY ACTUATED LIFTING MECHANISM. Electric powered operators of the types listed in the schedule shall be provided by the gate manufacturer.

- a. Each electric actuating operator shall be designed to operate the gate under the maximum specified seating and unseating heads by using a maximum motor horsepower of 1 HP and shall be explosion proof. The motors shall be a maximum of 1 HP, operate on 460 volt, 60 hertz, 3 phase power and explosion proof. The actuator provided shall be complete with reversing started mounted integral to the actuator, the open and closed positions shall be protected by limit switches and the unit shall be complete with torque switches. The actuator shall be enclosed in a weatherproof housing, explosion proof (Class Div 1) and with a minimum rating of NEMA 4X. An open/close selector switch shall be integral to the actuator. Each actuator shall be equipped with a discrete output signal to the SCADA indicating the gate is in the closed position.
- b. Each gate supplied with an electric actuating operator shall be equipped with provisions allowing manual operation of the gate in the event of an actuator failure or extended power failure.

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12. YOKE. Self-contained gates shall be provided with a yoke made of structural members or formed plates. The maximum deflection of the yoke shall be 1/360 of the gate's span.

MATERIALS

PART	MATERIAL
Frame, yoke, stem guides, slide, stem extension	Stainless steel ASTM A-240 type 304L or 316L
Side seals, stem guide liner	Ultra high molecular weight polyethylene (UHMWPE) ASTM D-4020
Compression cord	Nitrile ASTM D2000 M6BG 708, A14, B14, E014, E034
Bottom seal	Neoprene ASTM D2000 Grade 2 BC 510
Threaded stem	Stainless steel ASTM A-276 type 303 MX or 316
Fasteners	ASTM F593 and F594 GR1 for type 304 and GR2 for type 316
Pedestal, handwheel and crank	Tenzaloy aluminum
Gasket (between frame and wall)	EPDM ASTM 1056
Stem cover	Polycarbonate ASTM D-3935
Lift nut, couplings	Manganese bronze ASTM B584 UNS-C86500

2.04. SLIDE GATES/STOP PLATES

A. DESIGN CRITERIA

1. Leakage for slide gates shall be restricted to 0.05 gpm/ft or less of the seal perimeter at the design seating head and the design unseating head.

B. MATERIALS OF CONSTRUCTION

1. All stainless steel referenced in this specification shall be Type 304 or Type 304L, ASTM A240 or ASTM A276 unless otherwise indicated herein.
- a. All welded stainless steel components shall be constructed of Type 304L stainless steel.

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- b. All structural stainless steel used in the construction of slides, frames and wall thimbles shall have a minimum material thickness of 1/4-inch.
- c. All non-welded stainless steel components, excluding anchor bolts and assembly bolts, shall be Type 304 stainless steel.
- d. Anchor bolts and assembly bolts shall be Type 316 stainless steel.

C. PRODUCT

1. SLIDE:

- a. The slide shall consist of a stainless steel plate that is reinforced with stiffeners to withstand the specified head conditions. The slide shall engage the frame a minimum of 1-inch on each side.
- b. The slide shall be reinforced with plates or channel shaped members to restrict deflection to 1/16-inch or less at the design head. See Contract Drawings for design head.
- c. The stiffeners shall be welded to the slide plate in the horizontal and vertical positions.
- d. The portion of the slide that engages the frame shall have a minimum thickness of 1/2-inch.

2. FRAME:

- a. The frame shall be constructed of stainless steel plate, with the guide section formed into "C" shaped channel to house the seal, and shall be reinforced to withstand the specified operating conditions.
- b. The use of angles as extensions from the guides to the yoke is not acceptable.
- c. The portion of the frame where the anchor bolt hole penetrates shall have a minimum thickness of 1/2-inch.
- d. The guide portion of the frame shall have a minimum weight of 13 lbs/ft. The channel shaped guide extensions shall have a minimum weight of 6 lbs/ft. Guide extensions constructed of angle are not acceptable.
- e. Lifting lugs shall be provided on all frame styles.
- f. The frame shall be of the configuration as shown in the Contract Drawings.

3. SEAL:

- a. The seal system shall consist of self-adjusting UHMWPE seals with a rubber compression cord.
- b. The UHMWPE seals shall be arranged to ensure that there is no metal-to-metal contact between the slide and frame.
- c. The compression cord shall be nitrile and shall be contained by the UHMWPE seal so that it shall not be in contact with the slide.
- d. Seal system shall be self-adjusting for the life of the gate. Adjustable wedging devices such as wedges, wedge bars and pressure pads are not acceptable.
- e. Rubber side seals and/or invert seals such as J-bulb seals, P-seals and D-seals are not acceptable in lieu of UHMWPE seals.
- f. All seals shall be secured with assembly bolts. All seals shall be field removable and field replaceable without the need to remove the gate frame from the wall.
- g. The seal system shall have been shop tested with a 25,000 cycle operating test in

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an abrasive environment to confirm the ability of the seals to withstand the abrasive condition with negligible deterioration and to confirm that the leakage restriction requirement is still possible.

- i. The shop test shall have been performed on a stainless steel sluice gate and the test results shall have been certified by the manufacturer in writing.
- ii. A copy of the test shall be provided to the Engineer.

4. OPERATING MECHANISM:

- a. Stop Gates will be lifted out by hand. Provide eclipse opening in gate to be able to lift comfortably.

8. ANCHORAGE:

- a. Anchor bolts and wall thimble studs shall be 316 stainless steel, fully threaded and shall have a minimum diameter of 1/2-inch.
 - i. The base plate, adaptor plate and gussets shall be minimum 3/8-inch thick.

9. FINISH:

- a. All heat tint and slag from the welding process shall be acid passivated or mechanically passivated through bead blasting in accordance with ASTM A380. Grinding or buffing is not acceptable in lieu of passivation.
- b. All ferrous components shall be suitably prepared and then shop coated with primer. Finish coating shall be applied by the Contractor.

10. FACTORY TESTING:

- a. All gates shall be factory water tested in the unseating head condition at the design head listed. Feeler gauge testing is not an acceptable alternative to water testing.
- b. Certified test results shall be provided to the Engineer for review prior to shipment. Testing shall confirm compliance with the specified leakage restriction requirements.

2.04 GATE AND WEIR SCHEDULE

Refer to Contract Plans for Gate and Weir Schedule

PART 3 EXECUTION

3.01 INSTALLATION

Gates and appurtenances shall be handled and installed in accordance with the manufacturer's recommendations.

3.02 FIELD QUALITY CONTROL

A. Operational Test

1. Prior to acceptance by owner, an operational test of the gates and weirs shall be conducted, consisting of operating each gate or weir through at least two complete open/close cycles. If

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an electric or hydraulic operator is used, limit switches shall be adjusted following the manufacturer's instructions. Tests shall demonstrate that all equipment is electrically, mechanically, structurally, and otherwise acceptable; it is safe and in optimum working condition; and conforms to the specified operating characteristics. Gates shall be checked for leakage by the contractor per the performance section.

END OF SECTION

SECTION 15081
TAPPED CONNECTIONS

PART 1. GENERAL

- 1.0 Work Specified
 - A. Tapping and installing of corporation stops and valves on existing or newly installed pipes without interruption of service.
 - B. Connections located as shown on the Contract Drawings or as specified or directed.
 - C. Installing of curb stops and boxes where specified or directed.
- 1.1 Related Work Specified Elsewhere
 - A. Section 02615 – Ductile Iron Pipe
 - B. Section 15104 - Gate Valves
- 1.2 Applicable Codes, Standards and Specifications
 - A. American Water Work Association (AWWA)
 - B. ANSI/AWWA C110 - Ductile Iron and Gray Iron Fittings, 3 inch through 48 inch, for Water and Other Liquids.
 - C. ANSI/AWWA C111 - Rubber-Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings.
 - D. ANSI/AWWA C500 – Metal Seated Gate Valves for Water Supply Service, 3 inch through 48 Inch NPS.
 - E. ANSI/AWWA C509 - Resilient Seated Gate Valves, 3 inch through 20 inch NPS, for Water Supply Service.
 - F. AWWA C223 – Stainless Steel Tapping Sleeve
- 1.3. Submittals
 - A. Detail drawings for each size corporation stop, curb stop, tapping sleeve and valve, and service box.
 - B. Product Data and complete parts list.
 - C. Operation and Maintenance (O&M) Data:
 - D. Shop Drawings
 - E. Affidavit of Compliance
 - 1. Submit the manufacturer's affidavit stating that the valve complies with all applicable provisions of AWWA C 500.

PART 2. MATERIALS

- 2.0 Corporation Stops
 - A. Corporation stops shall be as detailed in Section 02615 – Ductile Iron Pipe and the Contract Plans
- 2.1 Curb Stops
 - A. Curb stops shall be as detailed in Section 02615 – Ductile Iron Pipe and the Contract Plans
- 2.2 Service Clamps
 - A. Service clamps shall be designed for use on the type of pipe to which the connection is being made.
 - 1. Ductile iron and asbestos-cement service clamps shall be the double strap type with neoprene gaskets.

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TAPPED CONNECTIONS

2. Polyvinyl chloride pipe service clamps shall be of a full circle design with a minimum width of 2 inches.
3. Prestressed concrete pipe service clamps shall be made by or approved for use by the pipe manufacturer.
4. Service clamps shall be manufactured by:
 - a. Dresser
 - b. Mueller
 - c. Clow
 - d. Approved Equal

2.3 Service Boxes

- A. Service boxes shall be as detailed in Section 02615 – Ductile Iron Pipe and the Contract Plans

2.3 Tapping Sleeves and Valves

- A. Specifications for stainless steel sleeves
 1. Sleeve: ANSI/AWWA C223.
 2. Joints: ANSI/AWWA C111, mechanical joint with 125 pound tapping flange, rubber gasket.
 3. Bolts: 18-8 Type 304 Stainless Steel.
- B. Tapping sleeves and valves shall be used for connections larger than 2 inches.
 1. Tapping sleeves shall be designed and sized in accordance with the recommendations of the manufacturer.
 2. Working pressure shall be 150 psi unless higher pressures are scheduled.
 3. The seal of the tapping sleeve shall be mechanical joint.
 4. Valves for tapping sleeves shall be designed for the intended service and shall conform to the requirements of the Section entitled "Gate Valves".
 5. Tapping sleeves and valves shall be manufactured by:
 - a. Smith Blair Model 663
 - b. Approved Equal
- C. Materials
 1. Tapping sleeve body and neck shall be made of heavy 18-8 Type 304 stainless steel.
 2. The flange shall be 304 stainless steel AWWA Class D and recessed to accommodate tapping valves per MSS-SP-60.
 3. The studs shall be 18-8 type 304 stainless steel with NC threads and epoxy coated. The nuts shall be 304 stainless steel, fluoropolymer coated to prevent galling.
 4. The gasket shall be ¼" thick, gridded and have a molded outlet ring to ensure effective sealing. The gasket shall be NSF 61 Nitrile (Buna N) for use in water or other fluid applications. The gasket shall have bridge plates made of heavy 302 stainless steel. The bridge plates shall be recessed and bonded into the gasket.
 5. All welded stainless steel surface areas shall be fully passivated for maximum corrosion protection.

SECTION 15081
TAPPED CONNECTIONS

PART 3. INSTALLATION

3.1 General

- A. Connections shall be installed by or under the direction of personnel who have performed at least ten similar connections.
 - 1. Threaded taps shall be made using a machine designed for cutting, threading and inserting the corporation without interruption of service.
 - 2. Teflon tape shall be used on corporation threads.
- B. Tapping sleeve connections shall be made using a machine to cut and remove the segment through the valve without interruption of service.
- C. Service boxes shall be set plumb and shall be independently supported on two bricks so no weight will be transmitted to the curb stop or carrier pipe.
- D. Service clamps and tapping sleeves installed on prestressed concrete pipe shall be encased in a minimum of 2 inches of concrete mortar after installation.

E. MAXIMUM SIZE FOR THREADED TAPS

Pipe Material	Pipe size (inches)				
	4	6	8	12	16 & Larger
Ductile Iron					
w/Service Clamp	2	2	2	2	2
w/o Service Clamp	-	3/4	1	1-1/2	2
Polyvinyl Chloride					
w/Service Clamp or					
prethreaded collar	3/4	1-1/2	2	2	2
w/o Service Clamp	NOT ALLOWED				
Prestressed Concrete					
w/Service Clamp or					
prefabricated tapped					
hole	-	-	-	-	2
w/o Service Clamp	NOT ALLOWED				

3.2 Testing

- A. Tapping crew shall perform a hydrostatic test on the installed tapping sleeve and valve.
 - 1. Sleeve and valve shall maintain 150 psi for five (5) minutes with no leakage.
 - 2. If tapping sleeve or tapping valve leaks, remove, replace and reinstall the tapping sleeve or tapping valve, if necessary.
 - 3. Retest reinstalled or replaced sleeve and valve until it achieves satisfactory test results.
 - 4. No air testing is allowed.
- B. Backfill excavation in accordance with Section 02221.

END OF SECTION

SECTION 15094
PIPE HANGERS AND SUPPORTS

PART 1. GENERAL

- 1.0 Pipe hangers and supports include all metallic hanging and supporting devices and all concrete piers for above ground or interior pipelines, conduits and fittings, except electrical conduits. Hangers and supports for electrical work are specified under the Materials and Performance Section headed "Conduits". In general, hangers and supports shall be spaced not more than 10 feet apart and at or near changes in direction of pipelines. Unless otherwise shown, specified or directed, no piping shall be supported from other piping or metal stairs, ladders or walkways.

PART 2. MATERIALS

2.0 STANDARDS

- A. Pipe for supports shall be in accordance with the following standards:
1. Wrought Steel Pipe - ASTM Des: A 53 Schedule 40
 2. Ductile Iron Pipe - ANSI Des: 21.6 and 21.8, Thickness Class 52
 3. 316 Stainless Steel – For all underwater supports.
 4. Stainless steel pipe hangers – For all wet well areas.
- B. Structural steel, wrought metals and metal castings used for hangers and supports shall meet the requirements of the applicable Materials and Performance Sections.

2.1 DESIGN

- A. Supporting devices shall be designed and arranged by the Contractor in accordance with the best practice and shall be installed to provide a working safety factor of not less than 12 for each hanger, assuming that the hanger is supporting 10 feet of pipe filled with water.
- B. Hangers and supports shall be of approved standard design where possible and shall be adequate to maintain the supported load in proper position under all operating conditions.

2.2. HANGERS

- A. Overhead hangers for pipes 10 inches in diameter and smaller shall be supported by threaded rods and shall be of the split ring type. Overhead hangers for pipes 12 inches in diameter and larger and for smaller pipes where shown or specified, shall be single rolls and sockets.

2.3 SUPPORTS

- A. Brackets for supporting piping from walls or columns shall be furnished with back plates where required to prevent the safe bearing capacity of the wall from being exceeded.
- B. Saddle stands shall be of the adjustable type with floor flanges for bolting to floors of foundations. Stanchions shall be similar to saddle stands except that they shall have a top yoke.
- C. Isolation between all pipes and saddles shall be installed, utilizing EDPM rubber rated for temperatures between 0° and 250° F.
- C. Pipelines 3 inches in diameter and smaller not requiring adjustment may be supported on single hooks.
- D. Anchor chairs shall be used where shown or specified for holding pipelines in rigid alignment.
- E. Where piping is installed on structural steel supports, blocking or pipe rolls shall be provided to arrest lateral pipe movement.
- F. Insulated pipes 2-1/2 inches in diameter and larger shall be provided with protection saddles.
- G. Beam and channel clamps shall be of malleable iron. Channel sections for piping supports systems shall be equal to Series P-1000 by the Unistrut Products Company or series PS-200 Power Strut by Van Huffle Tube Corp or equal and shall be complete with

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PIPE HANGERS AND SUPPORTS

clamping nuts and fittings. Finish for channel sections and fittings shall be hot dipped galvanized conforming to ASTM A-153. All exposed channel ends shall be provided with end caps. All concrete inserts shall have plastic coated filler to prevent concrete seepage. Concrete piers shall be of Class "B" concrete.

2.4 INSERTS

- A. Inserts for concrete shall be hot dipped galvanized and shall be installed in concrete structures where required and where shown on Contract Drawings. Continuous inserts shall be Series P-3200 by Unistrut Products Company or Series PS-349 Power Strut by Van Huffle Tube Corp or equal and shall be complete with clamping nuts and fittings. Finish for channel sections and fittings shall be hot dipped galvanized conforming to ASTM A-153. All exposed channel ends shall be provided with end caps. All concrete inserts shall have plastic coated filler to prevent concrete seepage. Concrete Piers shall be of Class "B" concrete.

2.5 HANGER RODS

- A. All hanger rods shall be a minimum 304 stainless steel.

- B. Hanger rods shall be not less than the following:

Size of Pipe (Inches)	Diameter of Rod (Inches)
up to 2	3/8
2-1/2 to 3-1/2	1/2
4 and 5	5/8
6 and 8	3/4
10 and 12	7/8
14 and 16	1

2.6 PAINTING AND COATING

- A. Hangers and supports shall be painted in accordance with the Section entitled "Painting".

END OF SECTION

SECTION 15096
FLEXIBLE PIPE COUPLINGS

PART 1. GENERAL

1.0 Work Specified

- A. Sleeve type couplings, rubber expansion couplings, flexible metal hose couplings and expansion couplings as specified and shown on the Contract Drawings.

1.1 Related Work Specified Elsewhere

- A. All Pipe Sections

PART 2. MATERIALS

2.0 Bolted Type Couplings (Dresser or equal)

- A. Sleeve type couplings shall be designed to fit the outside diameter of the pipes they connect.
- B. Unless otherwise specified, the solid sleeve coupling shall have the following minimum dimensions:

<u>Pipe Diameter</u>	<u>Length</u>
Less than 6 inch	4 inches
6 inch – 8 inch	5 inches
10 inch - 16 inch	6 inches
18 inch - 36 inch	9 inches
42 inch and larger	12 inches

- C. Bolts and nuts shall be galvanized or cadmium plated for non-submerged service and shall be stainless steel for submerged service.
- D. Gaskets shall be natural or synthetic rubber of a grade suitable for the intended service.
- E. Bolted couplings for 4” – 16” shall be Dresser Style 253 Modular Cast Coupling or approved equal.
- F. Bolted Couplings for 18” – 42” shall be Dresser style 38 coupling or approved equal.

2.1 Rubber Expansion Couplings

- A. Rubber expansion couplings shall be standard spool type.
- B. The tube shall be of a single piece construction and extended to the outside edges of the flanges.
- C. The exterior surface shall be oil resistant.
- D. Flanges shall be full faced fabric reinforced rubber.
- E. The split retainer rings shall be galvanized steel.
- F. Rubber expansion couplings shall be Metraflex style 711 wide arch spool type or approved equal.

2.2 Flexible Metal Hose Couplings

- A. Flexible metal hose couplings in pressure piping to compressors, engines and similar applications shall be seamless corrugated tubing covered with high tensile wire braid.
1. Shall be bronze unless otherwise shown.
 2. Flexible metal hose couplings for engine exhaust and other non-pressure piping shall be strip wound galvanized steel unless otherwise shown on the Contract Drawings.

SECTION 15096
FLEXIBLE PIPE COUPLINGS

2.3 Expansion Couplings

- A. Expansion couplings shall be the internally guided sleeve type.
- B. Packing shall be suitable for the intended service.
- C. Where the type of connection is not scheduled or shown, the joints shall be as required to conform to the type of pipe joints at point of installation.

2.4 Repair Clamp Split Type

- A. Repair clamps shall be of split construction capable of being installed over pipe in place.
- B. Repair clamps shall be as manufactured by Ford Meter Box Company type FS2, double section, and FS3 triple section, stainless steel or approved equal.
- C. Unless otherwise specified, or another length is approved by the Engineer, the following ratios of pipe diameter to clamp diameter will be used:

Pipe Diameter Inches	Clamp Length Inches
4"	7.5"
6"	10"
8"	12.5"
10"	15"
12"	20"
18"	24"

2.5 Harness Rods

- A. Harness rods and nuts shall be of heat treated steel.
 - 1. Minimum yield strength, 70,000 psi.
 - 2. Minimum ultimate strength, 110,000 psi.
 - 3. American Standard Course Threads.
 - 4. Galvanized or cadmium plated unless otherwise specified.

2.6 Pressure Rating

- A. Flexible pipe couplings shall be designed to withstand the test pressure specified for the pipeline in which they are to be installed.

PART 3 EXECUTION

3.1 SUBMITTALS

- A. Drawings and manufacturer's data showing details of materials and construction.

3.2 INSTALLATION

- A. Flexible pipe couplings shall be installed in accordance with the manufacturer's recommendations.
 - 1. Bolts shall be checked for uniform torque.
- B. Couplings shall not be used to support the weight of adjoining piping or fittings.
- C. Harness rods shall be installed on flexible pipe couplings where specified or shown on the Contract Drawings.
 - 1. On steel pipe, lugs shall be as shown on the Contract Drawings.
 - a. Lugs and welds shall be such to develop the full strength of the harness rods.
 - b. Lugs on galvanized pipe shall be galvanized after welding.
 - 2. Socket clamps harnessing ears as shown shall be used on ductile iron pipe.

SECTION 15096
FLEXIBLE PIPE COUPLINGS

3. When installed underground or underwater the couplings and harness rods shall be painted, after installation, with two coats of tar pitch preservative coating unless otherwise specified.

END OF SECTION

SECTION 15100
MISCELLANEOUS VALVES AND TRAPS
2.5" AND SMALLER

PART 1. GENERAL

- 1.0 This section includes all valves 2-1/2 inches and smaller to be installed in pressure pipelines and all special valves and traps not specified elsewhere.

PART 2. PRODUCTS

- 2.1 Valves 2-1/2 inches in diameter and smaller shall be solid brass, bronze or polyvinyl chloride as noted with screwed ends or with solder joint where specified. Valves located in flanged piping shall have flanged ends. Unless otherwise specified, rubbing surfaces in contact during the seating operation shall be either solid bronze or faced with bronze for metal valves. Unless otherwise specified, valves shall be designed for 125 psi working pressure.
- 2.2 Valves shall be equipped for nut, wrench or handwheel operation, as shown or required and shall be equipped with extension stems where necessary. Each valve shall be supplied with a handwheel or wrench as required.
- 2.3 All manually operated valves shall open by turning to the left (counterclockwise). Each valve shall have the name of the manufacturer and the size of the valve cast on the body or bonnet in raised letters. All valves and traps of like type furnished under one Contract shall be the product of one manufacturer.
- 2.4 GATE VALVES
Gate valve bodies shall be bronze except the 2-1/2 inch size which shall be iron. The valves shall be the single disc double seat, tapered wedge type, built to the manufacturer's standards with materials and construction conforming to AWWA Specification C-500 insofar as possible. Unless otherwise shown, gate valves shall have handwheel operators.
- 2.5 CHECK VALVES
Check valves bodies shall be bronze except the 2-1/2 inch size which shall be iron. The valves shall be horizontal, single disc, swing type with renewable bronze seat rings, bronze discs or disc rings and bronze disc hinges and pins and shall be designed to give a full diameter passage. Discs shall be carefully mounted and shall swivel on disc hinges. Pins, discs and other parts shall be properly adjusted to operate satisfactorily. Flow direction arrow shall be provided.
- 2.7 GLOBE AND ANGLE VALVES
Tapered plug globe valves shall be Catalogue No. 212P as manufactured by the Crane Company or #245 P by Walworth or equal and angle valves shall be Crane No. 214P or # 246P by Walworth or equal. Composition disc globe valves shall be equal to Crane No. 212 C and angle valves shall be Crane No. 214 C or equal. Composition discs shall be of the proper materials for the intended service.
- 2.8 HOSE VALVES AND COCKS
Hose valves for service in water lines shall be bronze angle hose valves equal to Crane No. 117 or No. 96 by Walworth or equal and bronze wedge disc type hose valves equal to Crane No. 451 or No. 24 by Walworth or equal. All hose valves shall have American Standard Iron Pipe Hose Threads on the outlet end and shall be equipped with brass cap and chain.

PART 3. EXECUTION (NOT USED)

END OF SECTION

SECTION 15300
GENERAL REQUIREMENTS FOR HVAC AND PLUMBING

PART I GENERAL

1.01 SUMMARY

- A. This section includes the general requirements for the furnishing of HVAC and plumbing systems for the project.
- B. It is the intent of these Contract Documents that all systems, equipment, etc. be installed complete and rendered operative prior to the completion of this project.
- C. Provide all items, articles, materials, operation and methods listed, mentioned and scheduled on the Drawings and/or herein described, including all labor, materials, equipment and incidentals necessary and required for their completion, whether specifically mentioned or not.
- D. Provide complete installation in neat and workmanlike manner in conformance with best modern trade practice, by competent, experienced mechanics; all in accordance with requirements of local, state and federal agencies and public utility companies.

1.02 REFERENCES, CODES AND PERMITS

- A. References to standards, codes, specifications, recommendations shall mean the latest edition of such publications adopted and published at date of invitation to submit proposals.
- B. Comply with all applicable codes.
- C. Obtain and pay for all permits and certificates of inspection required to perform and/or complete the work in accordance with applicable law.

1.03 SUBMITTALS AND SHOP DRAWINGS

- A. Prepare and submit shop drawings in accordance with General Conditions, and Supplemental General Conditions.
- B. Where equipment requiring different arrangement of connections from those shown is approved, furnish revised layouts, if requested, and install the equipment to operate properly, and in harmony with the intent of the Drawings and Specifications, and make all changes in the work required by the different arrangement of the connections at no additional cost to the Owner.
- C. Substitutions:
 - 1. Except for items specifically indicated, all material items are specified as "or equal". Reference in these Specifications to any product, material, etc. identified by Manufacturer's name, catalog number, etc. shall be interpreted as establishing a minimum standard of quality and shall not be construed as limiting competition. The judgment of the Engineer as to equality shall be final.

SECTION 15300
GENERAL REQUIREMENTS FOR HVAC AND PLUMBING

1.04 EQUIPMENT DESIGN, INSTALLATION AND QUALITY

- A. Uniformity: Equipment or material of same type or classification, used for same purpose shall be product of same manufacturer.
- B. Design: Equipment and accessories not specifically described or identified by manufacturers' catalog numbers in the Contract Documents shall be in conformity with American Society of Mechanical Engineers, Institute of Electrical and Electronic engineers, Underwriters' Laboratory or other applicable technical standards, shall be suitable for performance required and shall have neat and finished appearance.
- C. Installation: Erect equipment in neat and workmanlike manner; align, level and adjust for satisfactory operation; install so that connecting and disconnecting of piping and accessories can be made readily, and so that all parts are easily accessible for inspection, operation, maintenance and repair.

1.05 COORDINATION

- A. Contractor is responsible for full coordination with all other trades.
- B. Become acquainted with space requirements of other trades; have materials on job and erected in conformance with building work schedule in full coordination and cooperation with other trades.
- C. Install work so as to harmonize with surrounding conditions. Before installing any equipment, become familiar with the Construction Drawings and other working plans, to include heating, ventilating and air conditioning, electrical, structural and install equipment to harmonize therewith.
- D. Consider location of apparatus, equipment, fixtures, piping outlets, etc. as approximate. The actual locations shall be as directed and as required to suit the conditions at the time of installation.

1.06 PROTECTION OF EQUIPMENT AND MATERIALS

- A. Responsibility for care and protection of work rests with Contractor until acceptance. After delivery, before and after installation, protect equipment and materials against theft, injury or damage from all causes.
- B. Protect equipment outlets and pipe openings with temporary caps, plugs or burlap.
- C. Follow manufacturer's recommendations for protection of equipment and materials during storage, construction and start-up.

1.07 CUTTING AND PATCHING

- A. Avoid unnecessary cutting and patching, through proper planning of work, provision of pipe sleeves and cooperation with other Contractors. Each Trade shall be responsible for all cutting, patching and restoration of his own work at no expense to the Owner and to

SECTION 15300
GENERAL REQUIREMENTS FOR HVAC AND PLUMBING

the satisfaction and approval of the Engineer.

- B. In no case shall structural members be cut or notched.

Finish: Clean, polish the non-ferrous metal parts of fixtures, equipment, connections and escutcheons.

- C. Maintain all areas in a clean, picked-up manner; remove surplus materials and debris caused by work.
- D. Replace broken glass; remove stains, spots, marks and dirt from finished work.

1.08 DATA TO BE PREPARED BY CONTRACTOR

- A. Shop Drawings.
- B. Reports of test results and balancing.
- C. Operating and maintenance instructions; lubricating charts.
- D. Tags and charts for equipment, systems and valves.
- E. 'As-built' Drawings (reproducible or cad disc).

1.09 INSTRUCTIONS

- A. Obtain Manufacturer's printed installation instructions to aid in properly executing work, on equipment requiring such directions, especially to insure that Manufacturer's warranty is applicable.
- B. Submit equipment Manufacturer's installation and operation instruction booklets, after proper oral instruction by Contractor and equipment manufacturer.

1.10 GUARANTEE

- A. Provide required guarantees for equipment in accordance to guarantee requirements listed in the specifications. Guarantee shall include service by the Contractor on a design summer and winter day to adjust the systems. Also, winterize units the first fall shutdown and perform the spring start-up both during the period of the guarantee and for one additional start-up for both air conditioning and heating equipment beyond the guarantee.

SECTION 15300
GENERAL REQUIREMENTS FOR HVAC AND PLUMBING

1.11 ELECTRICAL COORDINATION

- A. HVAC Contractor Responsibility:
 - 1. Mount all electric power consuming equipment specified under the Contract; i.e. motors and prewired control panels.
 - 2. Take responsibility for accuracy and completeness of Temperature Control Wiring. Provide all 24V control wiring.
 - 3. Furnish all necessary wiring diagrams, instructions, advice, supervision, etc., as may be necessary to accomplish wiring.
 - 4. The Electrical Trade shall be responsible for providing the field wiring and equipment as indicated in the wiring schematics on the Electrical Drawings;
- B. Electrical Contractor Responsibility:
 - 1. Provide power branch circuits to equipment provided under Division 15.
 - 2. Provide control wiring and/or equipment internal power wiring as indicated on the Electrical Drawings and/or Specifications.
 - 3. Provide all motor starters and disconnect switches.
 - 4. Provide contactors, relays, push-buttons, thermostats, interlocks, transformers, etc. which are indicated on Electrical Drawings and/or Specifications.

END OF SECTION

SECTION 15350
GENERAL EQUIPMENT, MATERIALS, METHODS FOR HVAC AND PLUMBING

PART I GENERAL

1.01 RELATED DOCUMENTS

- A. The general provisions of the Contract, including General Conditions, Supplementary Conditions, and General Requirements govern this Section.

1.02 MACHINERY ACCESSORIES

- A. Lubricating Devices: Provide oil level gauges, grease cups, grease gun fittings for machinery bearings as recommended by machinery manufacturer; keep lubricating means easily accessible.
- B. Guards: Provide belt and coupling guards to enclose couplings, belt pulleys and sheaves on belt-driven equipment. Construct of galvanized metal or galvanized expanded perforated sheet metal, or 1" mesh wire screen in angle frame with steel angle or channel mounting supports; make guard easily removable for access to belt, pulley or sheave. Conform to codes or regulations of agencies having jurisdiction. Provide access hole for checking rpms.

1.03 EQUIPMENT SUPPORTS, FOUNDATIONS, STANDS

- A. Design, Construction, Location:
 - 1. Construct supporting structures of strength to safely withstand stresses to which they may be subjected and to distribute properly the load and impact over building areas. Conform to applicable technical societies' standards, also, to codes and regulations of agencies having jurisdiction.
 - 2. Construct floor stands of structural steel members or steel pipe and fittings; brace and fasten with flanges bolted to floor.
 - 3. For ceiling or wall mounting, use suspended platform or strap hangers, bracket or shelf, whichever is most suitable for equipment and its location. Construct of structural steel members, steel plates, rods as required; brace and fasten to building structure or to inserts as approved.

1.04 PIPE AND EQUIPMENT PAINTING AND IDENTIFICATION

- A. System Painting: In mechanical equipment rooms where pipe is exposed, paint all uninsulated pipe, ductwork and equipment. Identify concealed piping and ductwork above suspended ceilings at all drops and risers as to size and service, in addition to the requirements for identification as indicated in paragraphs below. Pipe, ductwork and equipment in this Contract shall be painted as follows:
 - 1. Use white basic color for finish painting of uncovered pipes, ductwork, tanks and equipment.
 - 2. Paint: Semi-gloss enamel (latex base).
 - 3. Paint all steel work, stands and supports, etc. medium gray color.

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GENERAL EQUIPMENT, MATERIALS, METHODS FOR HVAC AND PLUMBING

B. System Identification:

1. Identify covered and uncovered pipes and equipment as listed in the following 'Schedule of Piping Systems Identification' which is based on American Standard "Scheme for Identification of Piping Systems" ASA A13.
2. Piping shall be identified at all drops and risers, at valves, penetrations thru walls and at maximum 30' intervals in straight run piping by means of bands of basic and identifying colors and with stenciled "Legend" with arrow to indicate direction of flow. Seton "Setmark" of equivalent by Brady; EMED Co.

C. Schedule of Piping Identification:

<u>Service</u>	<u>Identifying Band</u>	<u>Legend</u>
Heating Hot Water Supply	Yellow/Black Letters	HWS
Heating Hot Water Return	Yellow/Black Letters	HWR
Refrigeration	Yellow/Black Letters	Refrigeration suction (RS)/liquid (RL)/ Hot gas RHG) as applicable.
Acid Waste Piping	Yellow/Black Letters	AW
Acid Vent Piping	Yellow/Black Letters	AV
LP Gas	Yellow/Black Letters	LPG
Vacuum	Yellow/Black Letters	VAC
Compressed Air	Yellow/Black Letters	CA
Fuel Oil Supply Piping	Green/Black Letters	FOS
Fuel Oil Return Piping	Green/Black Letters	FOR
Fuel Oil Fill Piping	Green/Black Letters	FOF
Fuel Oil Vent Piping	Green/Black Letters	FOV
Cold water	Green/White Letters	DCW

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GENERAL EQUIPMENT, MATERIALS, METHODS FOR HVAC AND PLUMBING

Domestic Yellow/Black Letters DHW
Hot water

- D. Equipment Identification: Identify each unit as to its nature, services, system number, other designation, by stenciling in letters of approved size and wording.
1. Identification Tags: Identify valves, controls, dampers, temperature and pressure tubing for controls, other parts of mechanical systems by means of polished and lacquered brass tags, 1-1/1" round for HVAC and 1-1/2" octagonal for Plumbing, with stamped letters or numbers 1/2" high, filled with black paint; fasten securely with brass "S" hooks or chains.

1.05 NOISE AND VIBRATION

- A. Mechanical and electrical equipment shall operate without objectionable noise or vibration.
- B. If such objectionable noise or vibration should be produced and transmitted to occupied portions of building by apparatus, piping or other mechanical work, make necessary changes and additions without extra cost to Owner.
- C. All trades involved shall pay particular attention to the proper installation of sound absorbers, acoustic linings, spring isolators, flexible connections, turning vanes in ducts, hangers for pipes, hole clearance for pipe expansion and equipment operating at rpm's not in excess of those specified.
- D. Isolators shall be selected for a maximum transmissibility of 5%.
- E. Spring isolators shall consist of steel top and bottom housing incorporating one or more springs. Design of mountings shall permit complete visibility of the springs and access for removal and change of springs without removal of mounting from under equipment. Mounting shall be provided with built-in leveling bolts and built-in adjustable, resilient shocks of a non-friction type to control oscillation and withstand lateral forces in all directions; they shall be Korfund Series WSC Vibro-isolators or equal, set on sound absorbing pads of organic material.
- F. Isolation hangers shall consist of a steel housing incorporating one or more steel compression springs with a noise isolation washer; Korfund Series VX or H Vibro hangers or equal.

1.06 PIPE SUPPORTS, HANGERS AND INSERTS

- A. Support all piping by means of approved hangers and supports to maintain required grading and pitching of lines to prevent vibration and to secure piping in place; arrange to provide for expansion and contraction.

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GENERAL EQUIPMENT, MATERIALS, METHODS FOR HVAC AND PLUMBING

- B. Anchors, guides, sway braces and supports designed in accordance with Section 6 of ASA Code B31.1 latest revision. Designed to support weight of pipe, fluid therein and covering thereon.
- C. One hanger shall not be hung or supported from another or other piping. Perforated band iron, chain or strap hangers are not acceptable.
- D. Hanger Rods: Mild, low carbon steel, fully threaded at each end, with two nuts at each end of positioning rod and hanger, locking each in place. Sizes as follows:

<u>Pipe Size</u>	<u>Hanger Rod Size</u>
1/2" to 2" ips	3/8" dia.
2-1/2" and 3" ips	1/2" dia.
4"	5/8" dia.
6"	3/4" dia.
8" & Larger	7/8" dia.

- E. Pipe Hangers: Height adjustable, clevis type or flat iron type. Flat iron type shall not be less than 1/8" x 1" wide and not used on larger than 2" pipe.
- F. Maximum center-to-center spacing of hangers:

<u>Pipe</u>	<u>Up to 1"</u>	<u>Over 1" IPS</u>
Steel Pipe	8'	10'
Copper Tube	6'	10'
Cast Iron	--	At each joint or 5' maximum
Plastic Piping	3'	4'

- G. Provide iron or steel insulation shields formed to fit the insulation for cold or low temperature piping. Shield shall not cut or pierce insulation or in any manner injure the vapor barrier.
- H. Use trapeze hangers where several pipes run in parallel at the same level. Submit design for review.
- I. Hangers, supports and inserts as manufactured for the particular application by Grinnell, Fee & Mason, Carpenter and Paterson, F&S Manufacturing or equal.

1.07 SLEEVES AND ESCUTCHEONS

- A. General: Sleeves are specified to be furnished and set in place under mechanical work sections: To be built in under General Construction Work.

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GENERAL EQUIPMENT, MATERIALS, METHODS FOR HVAC AND PLUMBING

- B. Sleeve Material:
1. Except where otherwise specified, each Trade shall construct sleeves for passage of pipe, ductwork, etc. through walls, floors, etc. of galvanized sheet steel with lock seam joints. Jet Line Products, Inc. or equal.
 2. Make sleeves of galvanized steel or wrought iron pipe, when they are located in concrete beams or concrete fire-proofing; in outside walls, foundations, footings or in floor.
- C. Sleeve Size: Make sleeves of sufficient diameter to permit free movement of pipe and of sufficient diameter to pass pipe insulation. Check floor and wall construction and finishes to determine proper length of sleeves for various locations; make actual length to suit following:
1. Terminate sleeves flush with walls, partitions, ceilings.
- D. Sleeve Installation:
1. Fill space between pipe and sleeve in all floor penetrations and all penetrations through rated walls with fire retardant caulking. 3M or equal, Fire Barrier System suitable for type of penetrations and UL rated for applicable wall and floor construction.
- E. Escutcheons, Plates:
1. Size: Inside diameter shall fit around insulation or around pipe when not insulated; outside diameter shall cover sleeve. Where sleeve extends above finished floor, escutcheon shall clear sleeve extension.
 2. Secure escutcheons or plates to pipe or sleeve but not to insulation.
 3. At walls, partitions, ceilings and on floors where sleeves are flush or extend only 1/4" above finished floor, use c-p brass plate.
 4. Where sleeves extend 1" above finished floor, use c-p brass plates.
 5. Where sleeves extend 1-1/2" above finished floor, use c-p cast brass plate, B&G Fig. 6A solid only, Ritter Fig. 5, solid or split.

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GENERAL EQUIPMENT, MATERIALS, METHODS FOR HVAC AND PLUMBING

PART II PRODUCTS

2.01 PIPE, FITTINGS AND JOINTS

- A. Pipe materials shall be in accordance with the following schedules; except where otherwise indicated or specified

SERVICE	SIZE	PIPE MATERIALS
Heating Hot Water, Radiant Heating water, supply and return piping; above ground	2-1/2" & Smaller	Copper tube Type 'L' ASTM B88
	3" & Larger	Copper tube ASTM B88 or Sch. 40 Black steel ASTM 53 (welded joints) or Sch. 10 Black steel with 'grooved' ends and 'victaulic' joints.
Cooling Coil Condensate Piping	All	Copper tube Type 'L' ASTM B88
Sanitary water & vent and storm drain piping – buried inside building and to 5'-0" outside building	All	Cast iron soil pipe, extra heavy or service wt. (ASTM A74) Bell & Spigot Ends, bitumen coated; neoprene compression gasket joints.
Waste, soil and vent piping above ground	3" & Larger	Cast iron soil pipe, service wt. (ASTM A74) plain end 'no-hub' joints.
Waste, soil and vent piping above ground	Less than 3"	Galvanized steel pipe Sch. 40 (ASTM A120) or Cast iron soil pipe, service weight (ASTM A74) plain end; 'no-hub' joints.
Domestic cold water piping (buried)	2-1/2" & Smaller	Copper tube, Type 'K' (ASTM B88)
(Domestic) hot, cold & circulating hot water piping above ground	2-1/2" & Smaller	Copper tube, Type 'L' (ASTM B88)
(Domestic) hot, cold & circulating hot water piping above ground	3" & Larger	Copper tube Type 'L' (ASTM B88)
LP Gas piping	All	Black Steel ASTM A53 Sch. 40
Fuel Oil Supply & return piping, and compressed air piping	All	Black Steel ASTM A53 Sch. 40

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Refrigerant piping	All	Copper Type 'L' ASTM B88, sealed refrigerant tubing
Laboratory(acid) waste and vent above ground and buried	All	Flame retardant poly-propylene drainage pipe & fittings, with electrical resistance fusion joints (GSR Fuseal, R.G. Sloan Mfg. Co. or equal).

- B. Fittings: Material, strength, quality, manufacture of fittings for pipes listed in above schedule; as per following listing, all elbows shall be long radius.
1. For fittings not specified herein, conform to manufacturer's literature and applicable industry standards.
 2. For Type L copper water tube fittings: Wrought copper solder-joint type; Mueller Brass Co. of Huron Mich., Chase Brass & Copper Co., NIBCO or equal.
 3. For cast-iron soil pipe, fittings to correspond to pipe in material, strength, ASTM Standards.
 4. For polypropylene laboratory waste and vent system, drainage fittings, fusion jointing process.
 5. For threaded drainage pipe, fittings: Black cast iron, recessed, threaded, drainage type, ASA B16.12; Crane Co., Stockham Co., or equal.
 6. For threaded piping, 2-1/2" and smaller – fittings: 150# Malleable iron, Stockham, Crane No., or equal.
 7. For steel piping, 3 inch and larger, fittings: Schedule 40 welding fittings.
 8. For Type K copper water tube, fittings: Wrought copper, solder-joint type; Mueller Brass Co. of Huron, Mich., Chase Brass & Copper Co., NIBCO or equal. Except as noted, where mechanical joints are required use flare tube fittings.
 9. Where changes in pipe sizes occur, use only reducing fittings.
 10. For drainage piping changed in direction, use long-sweep where possible, otherwise short sweep ¼ bends or combination & and 1/8 bends also Y's or in combination with other bends; use sanitary T branches only for horizontal branches discharging to stacks.
 11. Also refer to specific specification sections for additional requirements.
- C. Pipe Joints: Pipe joints shall be watertight, gas tight, under pressures required for various services; unless otherwise specified, join pipe as follows:
1. For pipe joints not specified herein - per Manufacturer's instructions. Also, see other sections of Specifications.
 2. Steel pipe 2-1/2" and smaller - screwed joints 150# malleable iron fittings.
 3. Steel pipe 3" and larger – welded joints; Sch. 40 welded fittings.
 4. Joints in above ground cast iron drainage pipe – “no-hub” type fittings.
 5. Joints in below ground cast iron drainage pipe – neoprene compression type (molded or tubular).
 6. Welding process and procedures.
 - a. Conform as to workmanship, testing, qualification of welders and general requirements with welding section of ASA B31.1 “Code for Pressure Piping”.
 - b. Join small branches into mains with weldolet or threadolet, instead of using welding type tee. “Small” shall mean that the branch is one size

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GENERAL EQUIPMENT, MATERIALS, METHODS FOR HVAC AND PLUMBING

- less than half the size of the main which it intersects.
 - c. Do not make direct welding connections to valves, expansion joints, stainer apparatus, other units which are intended to be removable.
 - 7. For threaded pipe joints, use approved pipe-joint compound; apply only on male threads. Cut pipe, nipples evenly; cut thread clean, remove burrs, ream ends to full inside bore. Do not have threads shown on finished piping exposed in rooms.
 - 8. For soldering or sweating joints on copper water tube, clean and polish outer surface of tube ends and inner surface as recommended by manufacturer of solder type fittings. Use 95/5 tin/antimony solder.
 - 9. For brazing wrought copper fittings for Refrigerant Piping, use silver bearing brazing filler material and flux.
 - 10. Gaskets for pipe flanges shall be ring type for RF flanges, full face for FF flanges; 1/16" thick, of compressed fiber and special compound.
 - 11. Flanges – same weight as fitting in same service category; screwed cast iron or welded steel type.
- D. Nipples: Conform to requirements of U.S. Dept. of Commerce Commercial Standard CS 5; of same material and weight as pipe whereon used, except when length of unthreaded part of standard weight nipple is less than 1-1/2", use extra heavy pipe nipple. Do not use close nipples.
- E. Unions: Provide unions, screwed or flanged, where indicated and in following locations even if not indicated:
- 1. In long runs of piping except drainage at intervals as directed, to permit convenient disassembly for alterations, repairs.
 - 2. In bypass around equipment.
 - 3. Do not conceal unions in walls, partitions, ceilings. Use right and left couplings only where directed.
 - 4. For 2" and smaller pipe, use screwed unions; over 2", flanged.
 - 5. For steel pipe, use malleable iron union, black or galvanized to conform to pipe, with bronze ground seats, E.M. Dart Mfg. Co., Flagg, NIBCO, Grinnell Co.

2.02 VALVES

- A. General:
- 1. Provide shut-off valves to isolate section of piping, fixtures and equipment for repairs where indicated and in following locations even if not indicated.
 - a. Risers and branches at points of take-off from their supply main.
 - b. Supplies to individual fixtures and other equipment which are not furnished with their own shut-off valve.
 - c. Individual equipment units at inlet and outlet to permit removal for repairs without interfering with remainder of system.
 - 2. Locate valves for easy access and operation; where concealed, provide access doors.
 - 3. Provide all gate, globe, check, ball, balancing cocks, plug, air vents and other types of valves as required for complete and proper valving of the entire installation to control flow, shut-off flow, prevent backflow, provide drainage and control pressure and temperature.

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4. Valves shall bear name or trademark of manufacturer and working pressure cast or stamped on valve body.
- B. Valve Requirements:
1. Unless otherwise indicated or specified for particular system or individual equipment unit, following requirements shall apply:
 - a. Gate valves 3" or smaller: Solid wedge, all bronze construction, inside screw handle type with screwed or sweat ends, 125 psig W.S.P. Jenkins Fig. 47U or Fig. 1242 or equal.
 - b. Gate valves larger than 3" – iron body, bronze mounted, solid wedge, OS&Y pattern with flanged ends, wheel handle, 200 psi W.O.G. Jenkins Fig. 651-A, S-413; Jenkins 92-A, 1222; Fairbanks 0640,0681.
 - c. Check Valves: 2-1/2" and smaller: Bronze horizontal swing check, 125 psig W.S.P. Jenkins 92-A or equal. 3" and larger -cast iron body, bronze mounted, 125# flanged, Jenkins 624 or equal.
 - d. Drain Valves: Installed at low points in piping and as otherwise required to completely drain piping systems and equipment. Drain valves - size as shown or required, in no case smaller than 3/4" ips. Jenkins 47-U, 1242.
 - e. Ball Valves: All sizes - bronze body, teflon seats, corrosion resistant, adjustable packing, threaded or solder ends, 400 psi W.O.G. NIBCO T-580, S-580; Apollo 70-100, 70-200; Jenkins 1101, 1100; Milwaukee BB-1-100.
 - f. Balancing Valves: AAF Series 4000 and 5000 or equal, brass thru 2", 150 psig or 225oF; 2-1/2" to 4" cast iron flanged, 125 psi at 225oF, full size of pipe shown on drawings.
 - g. Butterfly Valves – all sizes – wafer type, iron body, 200 psi, lever operator, O-ring inserts, ductile iron disc; Buna-N Liner. Demco, Keystone or equal. Provide gear wheel operation for valves 4" and larger.
 - h. Gas Cock: Walworth Mfg. Co. or equal:
2" and smaller – all bronze, lock wing type Fig. 625 with removable operator.

2.03 STRAINERS

- A. Y-pattern 1/16" perforated stainless steel screen; rated for 200 psi water; 3" and less, Sarco Type AT; or equal.
- B. Strainers to be full size of the pipe in which they are installed and have brass nipple and gate valve for blowing out dirt.

2.04 PRESSURE GAUGES

- A. 4-1/2" Dia. phenolic case, phosphor bronze bourdon tube, bronze bushed rotary movement, 1/4" N.P.T. brass socket connection, white aluminum dial face with black numerals and lines, 1/2% of full range accuracy, 270o range with suitable scale such that operating pressure is approximately 50% of full range, Ashcroft-Duragauge, or equal.

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- B. Mount gauges to be easily read from floor level using pulsation damper and 1/4" brass 'T' handle cock.

2.05 THERMOMETERS

- A. Aluminum 9-inch cast protective glass case front, red mercury tube, satin aluminum scale with etched black numerals and lines, stem length to suit pipe and scale to suit operating temperatures, adjustable variable angle mount for maximum visibility from floor level, union connections, separable socket, Weiss 'Vari-Angle' Type 9VU, or equal.

2.06 ACCESS DOORS

- A. Furnish and install access doors for concealed expansion joints, valves, traps, strainers, cleanouts, dampers, equipment and other parts requiring accessibility for operation and maintenance.

PART III EXECUTION

3.01 PIPE INSTALLATION

- A. General:
 - 1. Arrange, install piping approximately as indicated, straight, plumb and as direct as possible; form right angle or parallel lines with building walls.
 - 2. Keep pipes close to walls, partitions, ceilings; offset only where necessary to follow walls as directed, or as indicated. Provide for expansion and contraction.
 - 3. Locate groups of pipes parallel to each other; space them at distance to permit applying full insulation and to permit access for servicing valves.
 - 4. Install horizontal piping as high as possible without sags or humps.
 - 5. Install all overhead piping above ceiling in finished areas.
- B. Installation - Heating Hot Water, Piping:
 - 1. Mains, risers, branches, connections: Of size and arrangement as indicated.
 - 2. Provide shut-off valves in feed and return main branches and in runs to risers.
 - 3. Provide valved drains at low points and air vents at high points in system.
 - 4. Grade piping so that when system is filled, air in mains and risers will be carried up and discharged at venting points. Minimum pitch: 1/8" to 10'.
 - 5. For down-feed systems, connections shall come off bottom of main at a 45o angle.
- C. Installation – LP Gas Piping – Per NFPA 58.
- D. Water Supply Contamination: Make water connections to plumbing fixtures, other equipment using water, in manner which will eliminate possibility of spent water from fixtures being drawn back into water supply piping. For each “cross connection” and where indicated on Drawings, provide Watts No. 909 Series or equivalent as manufactured by Braukman, reduced pressure type backflow preventer. Size same as line size. Provide ‘air gap’ funnel and Type ‘L’ copper drain line to floor drain.

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- E. Draining Provisions for Water Supply Piping: Grade horizontal piping at uniform slope to low points for purpose of emptying piping of water when needed. Where constant pitch cannot be maintained for long runs, establish intermediate low points and rise to new level. Grade branches to drain to main or riser. At bottom of riser, at low points, provide ½" brass valves with nipple, cap. Where fixtures are connected to risers at lowest level, they may be considered as drains.

- F. Concealed Piping:
 - 1. Where so indicated or specified, conceal piping in building construction or underground. Install such piping in time so as not to delay work of other Divisions to allow ample time for tests and approval; do not cover before approval is obtained.
 - 2. Where furred spaces are indicated, keep pipes as close to structural members as possible so as to require minimum furring; in case of furred beams, obtain approval of resulting headroom clearance before installing pipes.

- G. Protection of Open Piping: Keep piping free from scale and dirt; protect open pipe ends whenever work is suspended during construction; use temporary plugs, burlap or other approved materials for protection.

- H. Pipes over Electrical Equipment:
 - 1. Do not route piping above electrical panels – coordinate with Division 16 for clearance requirements.

- I. Piping Diagrams:
 - 1. All piping diagrams on plans and all plans showing piping are intended to show the proper sequence of piping connections, device and the flow.
 - 2. Arrange, install piping to meet the actual flanges and tappings provided on the equipment by the manufacturers; install piping to leave maximum space around equipment.
 - 3. Locate valves conveniently for operation. Stems and wheel handles shall not project into aisle space unless otherwise specified. Do not locate valves with stems below horizontal. Leave adequate headroom for valve operation and maintenance.

3.02 TESTS

- A. General:
 - 1. Test work as specified herein and according to local code regulations. Code regulations shall govern if they are more stringent and conflict with specifications.
 - 2. Before testing piping systems, remove or otherwise protect from damage, control devices, air vents, other parts which are not designed to stand pressure used in testing piping.
 - 3. Provide test pumps, gauges, other instruments, materials, labor.
 - 4. Do not cover or paint any part of piping nor connect fixtures or equipment before testing and obtaining approval.
 - 5. Clean piping, equipment, specialties before testing.
 - 6. Where evidence of stoppage appears in piping on equipment, disconnect, clean,

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repair, reconnect obstructed parts.

- B. Disinfecting: Disinfect water main and service main with chloride of lime containing 25% chlorine or High Test Hypochlorite (H.T.H.) containing 70% chlorine. To each 10 foot length of pipe as it is being laid, 11/16 ounces of chloride lime or 1/4 ounces of H.T.H. shall be added. The disinfectant solution shall be allowed to stand in the pipe for 24 hours after which period the pipe shall be drained and flushed.
- C. Water System Test: Subject to water test under 150# pressure for three (3) hours with no drop in pressure.
- D. Drainage System Test:
1. Building Sewer: Subject to following test: plug ends; fill building sewer with water and test to at least 10 ft. head.
 2. Roughing or Water Test:
 - a. Apply to drainage system in sections when soil, waste, vent, leader drains, stacks, branches have been installed and system is complete, except for connections to fixtures and connection of building drain to sewer. Proceed as follows:
 - Close all openings, except highest in each section under test; fill each to point of overflow. In testing successive sections, include at least the upper 10 ft. of preceding section, so that no pipe or joint in the building except uppermost 10 ft. will be subjected to less than 10 ft. head of water.
 - Allow water to stand for at least two (2) hours before starting inspection. If leaks appear, make tight, repeat tests till all joints are tight and approved.
- E. Refrigeration System Testing:
1. Contractor shall thoroughly test all apparatus and work under this contract and by actual operation demonstrate to the Engineer that the apparatus is in perfect condition and doing the work it is intended to do under these specifications.
 2. The Contractor shall furnish all necessary instruments, do all the testing, take all the necessary readings and make all adjustments. He shall adjust all thermostats, valves, other controls and accessories to obtain the specified conditions.
 3. All of the testing shall be done before the work will be accepted. The Contractor shall notify the Engineer when he is ready to run any of these tests.
 4. Systems shall be subjected to a pressure of 235 psig or within 25 psi of the relief valve setting with moisture free nitrogen and a trace of refrigerant; and all joints, fittings, valves, etc. shall be thoroughly checked with a Leak Detector. All joints shall be struck with a rubber mallet.
 5. Following the pressure test, the entire system shall be dehydrated by evacuation until an absolute pressure of 0.18 inches mercury is reached as measured by a mercury manometer or wet bulb thermometer which must read 32°F or lower. Under no circumstances shall final pressure readings be taken by a Bourdon gauge. This vacuum shall be held for a 12-hour period without pressure increase. Before charging, the vacuum shall be broken with a refrigerant through a dryer. Refrigerant shall be introduced into the system at a point farthest from the

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vacuum pump connection. Sufficient refrigerant shall be introduced to raise the absolute pressure to 0.50 inches of mercury but under no circumstances shall this pressure exceed 0.75 inches. A second evacuation shall be made to a pressure of 0.25 inches.

6. The system shall then be charged with the required amount of refrigerant and set into operation. All joints shall be retested with a Leak Detector after 48 hours of actual operation.

F. Gas System Test: (Supplemental to requirements of NFPA 58)

1. Before any system of gas piping is finally put in service, it shall be carefully tested to assure that it is gas tight. Where any part of the system is to be buried, enclosed or concealed, this test should precede the work of closing in. To test for tightness, the piping may be filled with air or inert gas, but not with any other gas or liquid.
2. Before appliances are connected, piping systems shall stand a pressure of at least 15 psig for a period of not less than ten minutes without showing any drop in pressure. The source of pressure shall be isolated before the pressure tests are made.
3. All joints shall be tested with soapy water, applied around the outside of the joint, while system is under pressure.
4. Before gas has been turned on, all openings from which gas can escape shall be closed. Immediately after turning on the gas system, the piping system shall be checked by the gas vendor to ascertain that no gas is escaping.
5. When leakage is indicated: If the pressure drop on the gauge is noted, all appliance or outlets supplied through the system shall be examined to see if they are shut off and do not leak. If they are found tight, locate leak in the piping system. The gas supply shall be shut off until the necessary repairs have been made, after which the test specified above shall be repeated.

G. Piping Pressure Test:

1. Before testing piping systems, remove or otherwise protect from damage control devices, air vents, other parts which are not designed to stand pressures used in testing piping.
2. Hydrostatic Pressure: Test piping, hydrostatically, for all services except air to one and one-half times the maximum working pressure, but in no case to less than 50 psi; for at least four (4) consecutive hours, during which time pressure shall remain constant without pumping. Subject welded joints to hammer test while under hydrostatic pressure. For buried piping, maintain 100 psig for 24 hours.
3. Test welded piping for leaks; under 100 psi air pressure with soap suds; this test shall precede the previously specified hydrostatic test.
4. Do not paint, cover or conceal piping including all branches containing heating elements and the like before testing and obtaining approval.
5. Test piping which will be concealed in sections as approved; do it in manner which will not leave any pipe or joint untested.

H. Air Balancing and Distribution Tests:

1. Procure the services of an independent balance and testing agency which specialized in the balancing and testing of heating, ventilating and air

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- conditioning system. ADTEK, or equal. Submit name and credentials of proposed testing and balancing firm prior to executing work.
2. Do not begin air balance and testing until system has been completed and is in full working order. Put all heating, ventilating and air conditioning systems and related equipment into full operation and continue the operations of same during each working day of testing and balancing.
 3. Balance, test and adjust all air moving equipment, air distribution and exhausting systems as herein specified. All instruments used shall be accurately calibrated and maintained in good working order. Conduct tests in the presence of the Engineer or his representative. Replace motor and fan sheaves as necessary to achieve required air balance.
 4. Perform all specified tests, compile the test data and submit five (5) copies of complete and certified test data for review. Certified data shall include a list identifying all instruments used in the performance of testing and balancing.
 5. Include a warranty of 180 days after completion of test and balance work, during which time the Engineer may request a recheck, or resetting of any outlet, supply air fan, or exhaust fan as listed in test report, in order to "tune" the system to optimum operating condition.
 6. Testing Procedure: Perform the following tests and balance system in accordance with the following requirements:
 - a. Test and adjust fan RPM to design requirements; replace sheaves (at no additional cost) as required to attain design cfm.
 - b. Test and record motor no load and full load amperes and determine operating brake horsepower.
 - c. Make Pitot tube traverse of main supply ducts and obtain design cfm at fans.
 - d. Test and record system static pressures, suction and discharge.
 - e. Test and adjust system for design recirculated air, cfm.
 - f. Test and adjust system for design cfm outside air.
 - g. Test and record entering air temperatures. (D.B. heating and cooling; W.B. cooling).
 - h. Test and record leaving air temperatures. (D.B. and W.B. cooling and heating).
 - i. Adjust all main supply, return and exhaust air ducts to proper design cfm, supply and return.
 - j. Adjust all zones to proper design cfm, supply and return.
 - k. Test and adjust each diffuser, grille and register to within 10% of design requirements.
 - l. Identify each grille, diffuser and register as to location and area.
 - m. Identify size, type and manufacture of diffusers, grilles, registers and all tested equipment. Use manufacturer's ratings on all equipment to make required calculations.
 - n. Readings and tests of diffusers, grilles and registers shall include required FPM velocity and test resultant CFM after adjustments.
 - o. In cooperation with the control manufacturer's representative, make mechanical adjustments of automatically operated dampers to operate as specified, indicated and/or noted. Testing agency shall check these damper control operations for proper calibrations and list those requiring adjustment by control installers.

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- p. Where possible, all diffusers, grilles and registers shall have air patterns adjusted to minimize drafts in all areas.
- q. Adjust all outside air dampers to required air flow at 'minimum' position. Verify quantities with Engineer/Engineer prior to any balancing work.

I. Operating Tests:

- 1. After heating and air conditioning work has been completed, tested, adjusted and approved, test systems under normal operating conditions for two (2) days per system or longer when so directed to demonstrate that they fulfill requirements of plans, specifications and that they operate satisfactorily.
- 2. Operating Tests: Made during heating season and cooling season of the first year of operation at times when directed for proper setting and adjusting controls under peak load conditions.
- 3. Furnish copies of test data, computations, results, as directed.
- 4. During operating tests, arrange and pay for services of qualified and authorized representatives of manufacturers of equipment and controls to instruct designated operating personnel in operating and maintaining the systems.

3.03 CLEANING SYSTEMS

- A. General: After satisfactory completion of pressure tests, before permanently connecting equipment, strainers, other components, clean equipment thoroughly, blow and flush piping for sufficient length of time as directed so that interiors will be free of foreign matter.

3.04 ADJUSTMENTS, REPAIRS, RETEST, BALANCE WATER FLOW

- A. Adjustments, Repairs, Retests:
 - 1. Adjust automatic temperature controls for satisfactory operation.
 - 2. Make other adjustments, repairs, alterations; replace defective parts when directed.
 - 3. Correct defects disclosed by tests or inspection; replace defective parts when directed.
 - 4. In replacing defective parts, use only new materials; in case of pipe, replace with same length as defective piece.
 - 5. Caulking or back welding of screwed joints or peening of welds will not be permitted.
 - 6. Repeat tests after defects have been corrected and parts replaced as directed, until pronounced satisfactory.
 - 7. Test and adjust PRV's to specified reduced pressures.
 - 8. Test and set safety and relief valves to relieve pressures as required by governing code.
 - 9. Test and adjust gauges, thermostats, meters, other instruments, after installation, to assure accurate operation.
 - 10. Responsibility for Damages: Bear costs of repairs and restoration of work of other trades damaged by tests or cutting that had to be done in connection with tests.

END OF SECTION

SECTION 15360
INSULATION FOR HVAC AND PLUMBING

PART I GENERAL

1.01 RELATED DOCUMENTS

- A. The general provisions of the Contract, including General Conditions, Supplementary Conditions, and General Requirements govern this Section.

1.02 SHOP DRAWINGS

- A. Provide manufacturer's catalog cuts on all types of insulation to be used on this Project.

PART II PRODUCTS

2.01 PIPE INSULATION

- A. Insulate piping systems listed below with Owens Corning Fiberglass 25 ASJ pipe insulation or equal; thicknesses as indicated. Pipe insulation to have self-sealing lap; use Zeston Fittings; use pressure sensitive adhesive-coated butt joint sealing strips.
- B. Insulate valves, flanges and fittings with fiberglass insulation - cover with two (2) coats of insulating cement and use vapor barrier mastic for cold service insulation. In exposed areas, provide canvas finish on insulated valves and fittings. Insulation system to be UL approved for maximum rating of 25 for flame spread, 50 for fuel contributed and 50 for smoke developed.

<u>Piping System</u>		<u>Insulation Thickness</u>
Heating hot water supply & return piping	Runouts	1"
	Mains 2" & Smaller	1-1/2"
	Mains 2-1/2" & Larger	2"
Domestic hot, hot water recirc. & cold water piping.	Mains	1"
	Branches	1/2"

- C. Refrigerant Piping:
1. Insulate all indoor suction lines with nominal 3/4" thick flexible foamed plastic insulation, sealing longitudinal and butt joints with Armstrong's 520 Adhesive or equal.
 2. Insulate outdoor suction and liquid lines with 3/4" 'Armaflex' insulation. Finish with two (2) coats of 'Armaflex' finish.

2.02 DUCT INSULATION

- A. Air Conditioning Supply Ducts:
1. Air conditioning supply ducts, exhaust air and outside air ducts exposed in mechanical rooms and finished areas – 1" ASJ faced vapor seal (rigid) fiberglass boards (min. 3# density). All joints to be sealed with vapor barrier tape fastened

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- with adhesive; fasten with 1" type A stick klips. Owens Corning or equal.
2. Air conditioning supply ducts concealed above ceilings in chases, etc. – 1" fiberglass flexible seal insulation; FRK facing (K=.3). All joints sealed with 2" tab same material; install with adhesive supplemented with 18 galvanized soft copper clad wire on 18" centers – Owens Corning or equal.
- B. Outside Air Ductwork, Exhaust Air Ductwork between Fans and Wall Louvers, Concealed Above Ceilings or in Crawl Spaces: 2"-3/4# density; Fiberglass flexible seal insulation; FRK facing. All joints sealed with 2" tab same material; install with adhesive supplemented with 18 ga. Galvanized soft copper clad wire on 18" centers – Owens Corning or equal.
- C. Ductwork located outdoors: 2" ASJ faced vapor seal (rigid) fiberglass boards (min. 3" density). All joints to be sealed with vapor barrier tape fastened with adhesive; fasten with 1" type A stick clips. Owens Corning or equal – provide weatherproofing system consisting of rubber membrane roofing materials and as recommended by insulation manufacturer.

2.03 EQUIPMENT INSULATION

- A. Equipment Casing: Any air handling unit equipment casing not factory insulated, shall be insulated. Field insulation shall include 2" as specified for fresh air intake on mixing boxes, face and bypass dampers on any other part that is not insulated by the manufacturer.

PART III EXECUTION

3.01 INSTALLATION

- A. Include insulation materials, their applications, recanvassing; other finish, bands, tie wire, weather protection, frost proofing.
- B. Test, inspect, clean surfaces of and paint (where required) piping and equipment before applying insulation.
- C. Insulation shall be applied by experienced pipe coverers following best trade practice, guided by Manufacturer's printed installation directions.
- D. Insulation shall pass through walls, floors and partitions uninterrupted.
- E. Where space will not permit application of sectional insulation on pipes in wall chases, pack chases with loose fill insulation. Also, pack outside wall chases, subject to freezing, with loose fill insulation.
- F. Avoid direct contact between low temperature piping and supporting hangers. Hangers shall pass outside of a metal saddle which shall cover a section of rigid insulation (calcium silicate or rigid elastomeric, urethane or styrene foam) insulation. Hangers and saddles shall not pierce insulation and all vapor barriers to be unbroken and continuous.

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INSULATION FOR HVAC AND PLUMBING

- G. Conform to applicable Energy Conservation Codes.

3.02 INSULATION OMITTED

- A. Screwed Unions: Terminate insulation neatly at both sides of unions with plastic insulation.
- B. Vents to atmosphere, discharges from safety and relief valves, expansion compensators.
- C. Exposed connections to heating elements within enclosures.

END OF SECTION

SECTION 15500
HEATING, VENTILATING AND AIR CONDITIONING

PART I GENERAL

1.01 RELATED DOCUMENTS

- A. The general provisions of the Contract, including General Conditions, Supplementary Conditions, and General Requirements govern this Section.

1.02 SCOPE OF WORK

- A. Provide mechanical systems complete with connections, trimming, as indicated; specified and including but not necessarily limited to the following:
- 1) Ductwork systems and accessories; diffusers, registers, grilles, dampers, exterior louvers.
 - 2) Exhaust systems; fans, exhaust devices & accessories.
 - 3) Roof mounted fresh air intakes and accessories.
 - 4) Wall mounted fresh air intake and accessories.
 - 5) Electric unit heater systems and accessories.
 - 6) Temperature Controls.
 - 7) Removals as indicated and or required.
 - 8) Testing, balancing, start-up and adjustment.
 - 9) Applicable provisions of electrical coordination (15150).
 - 10) All the work of every description mentioned in this specification and shown on the drawings and all other labor and materials as may be reasonably inferred as needed to make the heating, ventilating and air conditioning work complete.
- B. Abbreviations: See Contract Drawings.
- C. Shop Drawings and Submittal Data: The equipment, materials and systems for which submittal of shop drawings and descriptive data is required includes, but is not necessarily limited to the following:
- 1) Rooftop Unit Ventilators.
 - 2) Roof Top Fresh Air Intake Units.
 - 3) Gauges and thermometers.
 - 4) Temperature control systems.
 - 5) Diffusers, grilles, registers, louvers.
 - 6) Heating and cooling system specialties.
 - 7) Dampers, all types.
 - 8) Vibration Accessories.
 - 9) Wiring diagrams.
 - 10) Fans.
 - 11) Ductwork layout and shop fabrication.
- E. Motors:
1. All motors to be premium efficiency type.
 2. Motors smaller than ½ HP shall have built-in overload protection.

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HEATING, VENTILATING AND AIR CONDITIONING

3. Unless otherwise indicated, all motors above ½ HP shall be suitable for 480V/3Ø /60Hz supply voltage as indicated. See schedules for motor characteristics.
- F. Coordination: The various mechanical trades and equipment suppliers are advised to see the schematic wiring diagrams on the electrical drawings. The electrical trade is responsible for providing only the field control and power wiring to mechanical systems shown schematically on electrical drawings; any additional wiring and equipment that is required and related to Division 15 work is the responsibility of Division 15 trades. Coordination between equipment suppliers, the electrical trade and H&V trade is imperative and is the responsibility of the H&V trade. Any discrepancies, errors of omission, additional items required, or the need for clarification of design intent shall be brought to the Engineer's attention in writing prior to the bid date; lack of coordination shall not be a basis for additional compensation.

PART II PRODUCTS

2.01 DUCTS AND AIR DISTRIBUTION

- A. General Requirements: Unless otherwise noted, all duct systems to be fabricated, installed, tested in accordance with SMACNA Standards.
- B. Low Velocity Ductwork (HVAC):
1. Materials: Unless otherwise noted, construct ducts of galvanized sheet steel, ASTM A93.
- C. Minimum Thickness and Gauges for Ductwork:
1. In accordance with following schedule:

<u>Max. Sizes</u>	<u>U.S. Std. Gauge Exposed</u>	<u>Aluminum Thickness</u>
Up to 12"	26	.025
13" to 30"	24	.032
31" to 60"	22	.040
61" to 84"	20	.050

- D. Supports and Bracing: Support ductwork by bars of heavy strap extending down over each side and under bottom of duct. Attach hangers to duct and support from building construction.
1. Elbows and bends: All turns to be long sweep with inner radius not less than the width of the duct; reduction in sizes to be gradual.
 2. Obstructions - Field Conditions: Include all required offsets. Transitions can be made to ducts of same effective area as sizes indicated on Drawings providing the aspect ratio (ratio of width to height) does not exceed 4 to 1. Transitions to have slope not exceeding 1 in 7 when increasing one side and not exceed 1 in 4 when decreasing one side.
 3. Duct Sealant: Paint all joints, seams and corners with duct sealant. 'Dura-Dyne' duct sealant or equal.

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4. Flexible Connections: Provide connection at the inlet and outlet of ducted fans and unit ventilators. Support ductwork so that no stress exists on the connection. Flexible connections shall be made of 6 inch wide neoprene held in place with heavy metal bands to prevent leakage, suitable for 6" static pressure.
- E. Dampers:
1. This trade shall provide and install all motorized control dampers/louvers.
 2. Motorized, built-in wall, balancing dampers/louvers in Motor and Electric Equipment rooms as shown on plans. Parallel damper blades shall be airfoil shape, galvanized steel double skin construction (14 ga. equivalent) filled with 1/2" expanded Polystyrene foam. All dampers/louvers specified to be thermally broken. All Dampers/Louvers to be a maximum of 6" in width. All dampers required to close against outside air shall have gasketed edges with TPE or silicone permanently bonded to the appropriate blade edges.

2.02 ROOF TOP VENTILATORS AND FRESH AIR INTAKE

- A. Roof top Ventilators: Centrifugal type, AMCA rated, spun aluminum housing, integral vibration isolators, non-overloading backwardly inclined wheel, belt drive, bird screen, weatherproof disconnect and finish as scheduled. All ventilators to mount to existing roof curbs. Where applicable, provide manufacturer prefabricated, insulated aluminum curb extenders or adapters compatible with the existing roofing system. Curb extender/adapters to house the gravity operated (loose) dampers specified. Greenheck Model CUBE, CUE as scheduled, or an approved equal.
- B. Fresh Air Intakes and Penthouses: Greenheck Model WIH, aluminum construction, aluminum birdscreen, throat size and maximum static pressure drop indicated on plans. Where applicable, provide site fabricated or manufacturer prefabricated aluminum curb extenders or adapters compatible with the existing roofing system.

2.03 WALL HEATERS AND UNIT HEATERS

- A. Wall Heaters (Electric)
1. Raywall, model E3055T2DWB or equal 115V/1 ϕ
 2. Internal blower and thermostat
 3. Capacity – See schedule on drawings.
- B. Unit Heaters (Electric):
1. Modine HER or equal. 480V/3 ϕ
 2. Direct connected motor and fan assembly; plug-in type motor leads, forward curved DI centrifugal fans.
 3. Factory insulated casing, baked enamel finish
 4. Each unit factory wired including for 115V/1 ϕ controls
 5. Capacity – See schedule on drawings.
- C. Unit Heaters (Electric explosion proof convection heater):

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1. Modine HEX or equal.
2. Cabinet: heavy 16 gauge steel casing, polyester powder coated finish.
3. Explosion Proof Junction Box
4. Heating Elements: Sealed, metal sheath, heavy-duty, low watt density, enclosed high grade resistance wire embedded in MgO refractory core. Elements are inserted in a copper tube with aluminum fins.
5. See schedule on Drawings for capacity, physical dimensions, and electrical requirements.

D. Schedule: As indicated on Drawing.

END OF SECTION

SECTION 11750
PUMP STATION CONTROL SYSTEM

- A. PUMP CONTROL System acceptance shall be defined as that time when the following requirements have been fulfilled:
1. All submittals and documentation have been submitted and reviewed and approved.
 2. The complete PUMP CONTROL System has successfully completed all testing requirements cited herein.
 3. The training program has been completed.
 4. Receipt of 3 copies of O&M Manuals.

3.05 WARRANTY

A written one year standard warranty from the date of the successful equipment start-up shall be provided by the equipment supplier to guarantee that there shall be no defects in material or workmanship in any item supplied.

Follow-up service for Control System: The manufacturer's representative shall return to the facility at the end of the Warranty period to address and rectify any operational issues which have arisen. This inspection does not eliminate the possible need for the representative to return sooner if equipment problems arise.

END OF SECTION

SECTION 16061
SERVICE GROUNDING AND BONDING

PART 1 GENERAL

1.01 SUBMITTALS

- A. Product Data: Catalog sheets, specifications and installation instructions.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Ground Clamps (Cable to Pipe): Blackburn/T&B Corp.'s GUV, Framatome Connectors/Burndy Corp.'s GAR, GD, GP, GK, or OZ/Gedney Co.'s ABG, CG.
- B. Ground Clamps (Cable to Rod): Blackburn/T&B Corp.'s GG, GGH, JAB, JABH, GUV, Dossert Corp.'s GN, GPC, Framatome Connectors/Burndy Corp.'s GP, GX, GRC, or OZ/Gedney Co.'s ABG.
- C. Ground Lugs: Copper, one or 2 hole style (to suit conditions), long barrel; Anderson/Hubbell's VERSAtile VHCL, Blackburn/T&B Corp.'s Color-Coded CTL, LCN, Framatome Connectors/Burndy's Hylug YA, Electrical Products Div./3M Scotchlok 31036 or 31145 Series, Ideal Industries Inc.'s CCB or CCBL, or Thomas & Betts Corp.'s 54930BE or 54850BE Series.
- D. Exothermic Type Weld: Erico Inc.'s Cadweld Process, or Furseweld/T&B Corp.'s Exothermic Welding System.
- E. Compression Connectors: Amp Inc.'s Ampact Copper Grounding System, or Burndy Corp.'s Hyground System.
- F. Rod Electrodes: Copper clad (minimum 0.010 jacket) ground rods minimum 3/4 inches diameter by 10'-0" long.
- G. Plate Electrodes: Copper plates minimum 0.06 inches thick by 2'-0" square feet of surface area.
- H. Grounding Electrode Conductors and Bonding Conductors: Copper conductors, bare or insulated with THW, THW-2, XHHW, XHHW-2, THWN, THWN-2 or THHN insulation.
- I. Hardware: Silicon-bronze bolts, nuts, flat and lock washers etc. as manufactured by Dossert Corp., Framatome Connectors/Burndy Corp., or OZ/Gedney Co.

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SERVICE GROUNDING AND BONDING

PART 3 EXECUTION

3.01 INSTALLATION

A. Connections:

1. Make grounding and bonding connections, except buried connections, with silicon-bronze hardware and ground clamps, ground lugs or compression connectors, to suit job conditions.
2. For buried connections use exothermic type weld or compression connectors.

END OF SECTION

SECTION 16071
FASTENERS, ATTACHMENTS, AND SUPPORTING DEVICES

PART 1 GENERAL

1.01 SUBMITTALS

- A. Shop Drawings: Show support details if different from methods specified or shown on the drawings.
- B. Product Data: Catalog sheets, specifications and installation instructions.

PART 2 PRODUCTS

2.01 ANCHORING DEVICES

- A. Sleeve Anchors (FS FF-S-325 Group II, Type 3, Class 3): Molly/Emhart's Parasleeve Series, Phillips' Red Head AN, HN, FS Series, or Ramset's Dynabolt Series.
- B. Wedge Anchors (FS FF-S-325 Group II, Type 4, Class 1): Hilti's Kwik Bolt Series, Molly/Emhart's Parabolt Series, Phillips' Red Head WS, or Ramset's Trubolt Series.
- C. Self-Drilling Anchors (FS FF-S-325 Group III, Type 1): Phillips' Red Head Series S or Ramset's Ram Drill Series.
- D. Non-Drilling Anchors (FS FF-S-325 Group VIII, Type 1): Hilti's Drop-In Anchor Series, Phillips' Red Head J Series, or Ramset's Dynaset Series.
- E. Stud Anchors (FS FF-S-325 Group VIII, Type 2): Phillips' Red Head JS Series.

2.02 CAST-IN-PLACE CONCRETE INSERTS

- A. Continuous Slotted Type Concrete Insert, Galvanized:
 - 1. Load Rating 1300 lbs./ft.: Kindorf's D-986.
 - 2. Load Rating 2400 lbs./ft.: Kindorf's D-980.
 - 3. Load Rating 3000 lbs./ft.: Hohmann & Barnard Inc.'s Type CS-H.
 - 4. Load Rating 4500 lbs./ft.: Hohmann & Barnard Inc.'s Type CS-HD.
- B. Threaded Type Concrete Insert: Galvanized ferrous castings, internally threaded.
- C. Wedge Type Concrete Insert: Galvanized box-type ferrous castings, designed to accept bolts having special wedge shaped heads.

2.03 MISCELLANEOUS FASTENERS

- A. Except where shown otherwise on the Drawings, furnish type, size, and grade required for proper installation of the Work, selected from the following: Furnish galvanized fasteners for exterior use, or for items anchored to exterior walls, except where stainless steel is indicated.

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1. Standard Bolts and Nuts: ASTM A 307, Grade A, regular hexagon head.
 2. Lag Bolts: FS FF-B-561, square head type.
 3. Machine Screws: FS FF-S-92, cadmium plated steel.
 4. Machine Bolts: FS FF-B-584 heads; FF-N-836 nuts.
 5. Wood Screws: FS FF-S-111 flat head carbon steel.
 6. Plain Washers: FS FF-W-92, round, general assembly grade carbon steel.
 7. Lock Washers: FS FF-W-84, helical spring type carbon steel.
 8. Toggle Bolts: Tumble-wing type; FS FF-B-588, type, class and style as required to sustain load.
- B. Stainless Steel Fasteners: Type 302 for interior Work; Type 316 for exterior Work; Phillips head screws and bolts for exposed Work unless otherwise specified.
- 2.04 TPR (THE PEEL RIVET) FASTENERS
- A. 1/4 inch diameter, threadless fasteners distributed by Subcon Products, 315 Fairfield Road, Fairfield, NJ 07004 (800) 634-5979.
- 2.05 POWDER DRIVEN FASTENER SYSTEMS
- A. Olin Corp.'s Ramset Fastening Systems, or Phillips Drill Company Inc.'s Red Head Powder Actuated Systems.
- 2.06 HANGER RODS
- A. Mild low carbon steel, unless otherwise specified; fully threaded or threaded each end, with nuts as required to position and lock rod in place. Unless galvanized or cadmium plated, provide a shop coat of red lead or zinc chromate primer paint.
- 2.07 "C" BEAM CLAMPS
- A. With Conduit Hangers:
1. For 1 Inch Conduit Maximum: B-Line Systems Inc.'s BG-8, BP-8 Series, Caddy/Erico Products Inc.'s BC-8P and BC-8PSM Series, or GB Electrical Inc.'s HIT 110-412 Series.
 2. For 3 Inch Conduit Maximum: Appleton Electric Co.'s BH-500 Series beam clamp with H50W/B Series hangers, Kindorf's 500 Series beam clamp with 6HO-B Series hanger, or OZ/Gedney Co.'s IS-500 Series beam clamp with H-OWB Series hanger.
 3. For 4 Inch Conduit Maximum: Kindorf's E-231 beam clamp and E-234 anchor clip and C-149 series lay-in hanger; Unistrut Corp.'s P2676 beam clamp and P-1659A Series anchor clip with J1205 Series lay in hanger.
- B. For Hanger Rods:
1. For 1/4 Inch Hanger Rods: B-Line Systems Inc.'s BC, Caddy/Erico Products Inc.'s BC, GB Electrical Inc.'s HIT 110, Kindorf's 500, 510, or Unistrut Corp.'s P1648S, P2398S, P2675, P2676.
 2. For 3/8 Inch Hanger Rods: Caddy/Erico Products Inc.'s BC, Kindorf's 231-3/8, 502,

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- or Unistrut Corp.'s P1649AS, P2401S, P2675, P2676.
- 3. For 1/2 Inch Rods: Appleton Electric Co. BH-500 Series, Kindorf's 500 Series, 231-1/2, OZ/Gedney Co.'s IS-500 Series, or Unistrut Corp.'s P1650AS, P2403S, P2676.
- 4. For 5/8 Inch Rods: Unistrut Corp.'s P1651AS beam clamp and P1656A Series anchor clip.
- 5. For 3/4 Inch Rods: Unistrut Corp.'s P1653S beam clamp and P1656A Series anchor clip.

2.08 CHANNEL SUPPORT SYSTEM

- A. Channel Material: 12 gage steel.
- B. Finishes:
 - 1. Phosphate and baked green enamel/epoxy.
 - 2. Pre-galvanized.
 - 3. Electro-galvanized.
 - 4. Hot dipped galvanized.
 - 5. Polyvinyl chloride (PVC), minimum 15 mils thick.
- C. Fittings: Same material and finish as channel.
- D. UL Listed Systems:
 - 1. B-Line Systems Inc.'s B-22 (1-5/8 x 1-5/8 inches), B-12 (1-5/8 x 2-7/16 inches), B-11 (1-5/8 x 3-1/4 inches).
 - 2. Grinell Corp.'s Allied Power-Strut PS 200 (1-5/8 x 1-5/8 inches), PS 150 (1-5/8 x 2-7/16 inches), PS 100 (1-5/8 x 3-1/4 inches).
 - 3. Kindorf's B-900 (1-1/2 x 1-1/2 inches), B-901 (1-1/2 x 1-7/8 inches), B-902 (1-1/2 x 3 inches).
 - 4. Unistrut Corp.'s P-3000 (1-3/8 x 1-5/8 inches), P-5500 (1-5/8 x 2-7/16 inches), P-5000 (1-5/8 x 3-1/4 inches).
 - 5. Versabar Corp.'s VA-1 (1-5/8 x 1-5/8 inches), VA-3 (1-5/8 x 2-1/2 inches).

2.09 MISCELLANEOUS FITTINGS

- A. Side Beam Brackets: B-Line Systems Inc.'s B102, B103, B371-2, Kindorf's B-915, or Versabar Corp.'s VF-2305, VF-2507.
- B. Pipe Straps:
 - 1. Two Hole Steel Conduit Straps: B-Line Systems Inc.'s B-2100 Series, Kindorf's C-144 Series, or Unistrut Corp.'s P-2558 Series.
 - 2. One Hole Malleable Iron Clamps: Kindorf's HS-400 Series, or OZ/ Gedney Co.'s 14-G Series, 15-G Series (EMT).
- C. Deck Clamps: Caddy/Erico Products Inc.'s DH-4-T1 Series.
- D. Fixture Stud and Strap: OZ/Gedney Co.'s SL-134, or Steel City's FE-431.

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- E. Supporting Fittings for Pendent Mounted Industrial Type Fluorescent Fixtures on Exposed Conduit System:
 - 1. Ball Hanger: Appleton Electric Co.'s AL Series, or Crouse-Hinds Co.'s AL Series.
 - 2. Flexible Fixture Hanger: Appleton Electric Co.'s UNJ-50, UNJ-75, or Crouse-Hinds Co.'s UNJ115.
 - 3. Flexible (Hook Type) Fixture Hanger: Appleton Electric Co.'s FHMF, or Crouse-Hinds Co.'s UNH-1.
 - 4. Eyelet: Unistrut Corp.'s M2250.
 - 5. Eyelet with Stud: Kindorf's H262, or Unistrut Corp.'s M2350.
 - 6. Conduit Hook: Appleton Electric Co.'s FHSN, or Crouse-Hinds Co.'s UNH-13.
- F. Supporting Fasteners (Metal Stud Construction): Metal stud supports, clips and accessories as produced by Caddy/Erco Products Inc.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Where specific fasteners are not specified or indicated for securing items to in-place construction, provide appropriate type, size, and number of fasteners for a secure, rigid installation.
- B. Install anchoring devices and other fasteners in accordance with manufacturer's printed instructions.
- C. Make attachments to structural steel wherever possible.

3.02 FASTENER SCHEDULE

- A. Material:
 - 1. Use cadmium or zinc coated anchors and fasteners in dry locations.
 - 2. Use hot dipped galvanized or stainless steel anchors and fasteners in damp and wet locations.
 - 3. For corrosive atmospheres or other extreme environmental conditions, use fasteners made of materials suitable for the conditions.
 - 4. Fasteners in process areas or areas subject to corrosive fumes or process liquids shall be PVC coated.
- B. Types and Use: Unless otherwise specified or indicated use:
 - 1. Cast-in-place concrete inserts in fresh concrete construction for direct pull-out loads such as shelf angles or fabricated metal items and supports attached to concrete slab ceilings.
 - 2. Anchoring devices to fasten items to solid masonry and concrete when the anchor is not subjected to pull out loads, or vibration in shear loads.
 - 3. Toggle bolts to fasten items to hollow masonry and stud partitions.
 - 4. TPR fasteners to fasten items to plywood backed gypsum board ceilings.

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5. Metallic fasteners installed with electrically operated or powder driven tools for approved applications, except:
 - a. Do not use powder driven drive pins or expansion nails.
 - b. Do not attach powder driven or welded studs to structural steel less than 3/16 inch thick.
 - c. Do not support a load, in excess of 250 lbs from any single welded or powder driven stud.
 - d. Do not use powder driven fasteners in precast concrete.

3.03 ATTACHMENT SCHEDULE

- A. General: Make attachments to structural steel or steel bar joists wherever possible. Provide intermediate structural steel members where required by support spacing. Select steel members for use as intermediate supports based on a minimum safety factor of 5.
 1. Make attachments to steel bar joists at panel points of joists.
 2. Do not drill holes in main structural steel members.
 3. Use "C" beam clamps for attachment to steel beams.
- B. Where it is not possible to make attachments to structural steel or steel bar joists, use the following methods of attachment to suit type of construction unless otherwise specified or indicated on the drawings:
 1. Attachment to Steel Roof Decking (No Concrete Fill):
 - a. Decking With Hanger Tabs: Use deck clamps.
 - b. Decking Without Hanger Tabs:
 - 1) Before Roofing Has Been Applied: Use 3/8 inch threaded steel rod welded to a 4 x 4 x 1/4 inch steel plate and installed through 1/2 inch hole in roof deck.
 - 2) After Roofing Has Been Applied: Use welding studs, or self-drilling/tapping fasteners. Exercise extreme care when installing fasteners to avoid damage to roofing.
 2. Attachment to Concrete Filled Steel Decks (Total thickness, 2-1/2 inches or more):
 - a. Before Fill Has Been Placed:
 - 1) Use thru-bolts and fish plates.
 - 2) Use welded studs. Do not support a load in excess of 250 pounds from a single welded stud.
 - b. After Fill Has Been Placed: Use welded studs. Do not support a load in excess of 250 lbs from a single welded stud.
 3. Attachment to Cast-In-Place Concrete:
 - a. Fresh Concrete: Use cast-in-place concrete inserts.
 - b. Existing Concrete: Use anchoring devices.
 4. Attachment to Cored Precast Concrete Decks:
 - a. New Construction: Use thru-bolts and fish plates before Construction Work Contractor has placed roofing insulation over the decks. Contractor shall not drill into or power fasten to bottom of precast plank.
 5. Attachment to Hollow Block or Tile Filled Concrete Deck:
 - a. New Construction: Use cast-in-place concrete inserts by having Construction Work Contractor omitting blocks and pouring solid blocks with insert where

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- required.
6. Attachment to Waffle Type Concrete Decks:
 - a. New Construction:
 - 1) Use cast-in-place concrete inserts in fresh concrete.
 - 2) If concrete fill has been applied over deck, thru-bolts and fish plates may be used where additional concrete or roofing is to be placed over the deck.
 7. Attachment to Precast Concrete Planks: Use anchoring devices, except do not make attachments to precast concrete planks less than 2-3/4 inches thick.
 8. Attachment to Precast Concrete Tee Construction:
 - a. New Construction:
 - 1) Use tee hanger inserts between adjacent flanges.
 - 2) Use thru-bolts and fish plates, except at roof deck without concrete fill.
 - b. Existing Construction:
 - 1) Use anchoring devices installed in webs of tees. Install anchoring devices as high as possible in the webs.
 - c. Do not use powder driven fasteners.
 - d. Exercise extreme care in drilling holes to avoid damage to reinforcement.
 9. Attachment to Wood Construction: Use side beam brackets fastened to the sides of wood members to make attachments for hangers.
 - a. Under 15 lbs Load: Attach side beam brackets to wood members with 2 No. 18 x 1-1/2 inch long wood screws, or 2 No. 16 x 1-1/2 inch long drive screws.
 - b. Over 15 lbs Load: Attach side beam brackets to wood members with bolts and nuts or lag bolts. Do not use lag bolts in wooden members having a nominal thickness (beam face) under 2 inches in size. Install bolts and nuts or lag bolts in the side of wood members at the mid-point or slightly above. Install plain washers under all nuts.

LOAD	LAG BOLT SIZE	BOLT DIA.
15 lbs to 30 lbs	3/8 x 1-3/4 inches	3/8 inch
31 lbs to 50 lbs	1/2 x 2 inches	1/2 inch
Over 50 lbs to load limit of structure.	Use bolt & nut	5/8 inch

- c. Bottom chord of wood trusses may be utilized as structural support, but method of attachment must be specifically approved.
 - d. Do not make attachments to the diagonal or vertical members of wood trusses.
 - e. Do not make attachments to the nailing strips on top of steel beams.
10. Attachment to Metal Stud Construction: Use supporting fasteners manufactured specifically for the attachment of raceways and boxes to metal stud construction.
 - a. Support and attach outlet boxes so that they cannot torque/twist. Either:
 - 1) Use bar hanger assembly, or:
 - 2) In addition to attachment to the stud, also provide far side box support.

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FASTENERS, ATTACHMENTS, AND SUPPORTING DEVICES

3.04 CONDUIT SUPPORT SCHEDULE

- A. Provide number of supports as required by National Electrical Code.
- B. Use pipe straps and specified method of attachment where conduit is installed proximate to surface of wood or masonry construction.
 - 1. Use hangers secured to surface with specified method of attachment where conduit is suspended from the surface.
- C. Use "C" beam clamps and hangers where conduit is supported from steel beams.
- D. Use deck clamps and hangers where conduit is supported from steel decking having hanger tabs.
 - 1. Where conduit is supported from steel decking which does not have hanger tabs, use clamps and hangers secured to decking, utilizing specified method of attachment.
- E. Use channel support system supported from structural steel for multiple parallel conduit runs.
- F. Where conduits are installed above ceiling, do not rest conduit directly on runner bars, T-Bars, etc.
 - 1. Conduit Sizes 2-1/2 Inches and Smaller: Support conduit from ceiling supports or from construction above ceiling.
 - 2. Conduit Sizes Over 2-1/2 Inches: Support conduit from beams, joists, or trusses above ceiling.

3.05 LIGHTING FIXTURE SUPPORT SCHEDULE

- A. General: Do not support fixtures from ceilings or ceiling supports unless it is specified or indicated on the drawings to do so.
 - 1. Support fixtures with hanger rods attached to beams, joists, or trusses. Hanger rod diameter, largest standard size that will fit in mounting holes of fixture.
 - a. Where approved, channel supports may span and rest upon the lower chord of trusses and be utilized for the support of lighting fixtures.
 - b. Where approved, channel supports may span and be attached to the underside of beams, joists, or trusses and be utilized for the support of lighting fixtures.
 - 2. Use 2 nuts and 2 washers on lower end of each hanger rod to hold and adjust fixture (one nut and washer above top of fixture housing, one nut and washer below top of fixture housing).
 - a. Where specified that an adequately supported outlet box is to support a fixture or be utilized as one point of support, support the box so that it may be adjusted to bring the face of the outlet box even with surface of ceiling.
- B. Specific Installations Where Fixtures May Be Supported From New Ceilings Being Installed By Construction Work Contractor:
 - 1. Support surface mounted fluorescent fixtures, LED fixtures, and incandescent fixtures directly from plywood backed gypsum board ceilings.

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2. Support surface mounted fluorescent fixtures, LED fixtures, and incandescent fixtures directly from framing or furring members of fire rated suspended ceilings (double gypsum board).
 3. Support recessed mounted fluorescent fixtures, LED fixtures, and incandescent fixtures directly from furring members of furred gypsum board ceilings.
 4. Support recessed mounted fluorescent fixtures, LED fixtures, and incandescent fixtures directly from the suspension system of suspended acoustical ceilings. Exception: Support each fixture weighing more than 50 pounds (including lamps) independent of the suspended ceiling grid.
 5. Deliver documents which state actual fixture weights and indicate fixture locations to the Construction Work Contractor (thru the Owner's Representative).
- C. Number of Supports For Ceiling Mounted Lighting Fixtures: Provide at least the following number of supports. Provide additional supports when recommended by fixture manufacturer, or shown on the drawings.
1. Commercial and Industrial Fluorescent Fixtures:
 - a. Support individual fluorescent fixtures less than 2 feet wide at 2 points.
 - b. Support continuous row fluorescent fixtures less than 2 feet wide at points equal to the number of fixtures plus one. Uniformly distribute the points of support over the row of fixtures.
 - c. Support individual fluorescent fixtures 2 feet or wider at 4 corners.
 - d. Support continuous row fluorescent fixtures 2 feet or wider at points equal to twice the number of fixtures plus 2. Uniformly distribute the points of support over the row of fixtures.
 - e. An adequately supported outlet box may be utilized as one point of support for fixtures weighing less than 50 pounds.
 2. Vandal Resistant, and Minimum Security Fluorescent Fixtures:
 - a. Support individual fluorescent fixtures less than 2 feet wide at 4 corners.
 - b. Support continuous row fluorescent fixtures less than 2 feet wide at points equal to twice the number of fixtures. Uniformly distribute the points of support.
 - c. Support individual fluorescent fixtures 2 feet or wider at each corner and one support midway along each side of longest axis (6 supports total).
 - d. Support continuous row fluorescent fixtures 2 feet or wider at points equal to 4 times the number of fixtures. Uniformly distribute the points of support.
 - e. An adequately supported outlet box may be utilized as one point of support for fixtures weighing less than 50 pounds.
 3. Medium Security Fluorescent Fixtures: Support each fixture at minimum of 6 points (each corner and midway along each side of longest axis). Outlet box shall not be counted as a point of support.
 4. Maximum Security Fluorescent Fixtures: Support each fixture at minimum of 8 points (each corner, and 2 supports spaced equally along each side of longest axis). Outlet box shall not be counted as a point of support.
 5. Mercury Vapor, Metal Halide, LED fixtures, and High Pressure Sodium Fixtures:
 - a. Commercial Style: Support fixture at 2 points.
 - b. Industrial Style: Support individual fixtures at one point.
 - c. Vandal Resistant Style: Support fixture at 4 points.

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FASTENERS, ATTACHMENTS, AND SUPPORTING DEVICES

- d. An adequately supported outlet box may be utilized as one point of support for fixtures weighing less than 50 pounds.
 - 6. Commercial and Industrial Incandescent Fixtures: Support fixture from adequately supported outlet box, to suit fixture design (fixture weight less than 50 pounds).
 - 7. Vandal Resistant Incandescent Fixtures: Support fixture from adequately supported outlet box to suit fixture design, plus 2 fasteners through back of fixture into suitable construction behind fixture.
- D. Number of Supports For Wall Mounted Lighting Fixtures: Provide at least the following number of supports. Provide additional supports when recommended by fixture manufacturer, or shown on the drawings.
 - 1. Commercial and Industrial Fluorescent Fixtures:
 - a. Support individual fluorescent fixtures 2 feet long or less at 2 points.
 - b. Support individual fluorescent fixtures over 2 feet long at 3 points.
 - c. Support continuous row fluorescent fixtures at points equal to twice the number of fixtures. Uniformly distribute the points of support.
 - d. An adequately supported outlet box may be utilized as one point of support for fixtures weighing less than 50 pounds.
 - 2. Vandal Resistant, and Minimum Security Fluorescent Fixtures:
 - a. Support individual fluorescent fixtures 2 feet long or less at 4 points (each corner).
 - b. Support individual fluorescent fixtures over 2 feet long at 6 points (each corner and midway along each side of longest axis).
 - c. Support continuous row fluorescent fixtures at points equal to 6 times the number of fixtures. Uniformly distribute the points of support.
 - d. An adequately supported outlet box may be utilized as one point of support for fixtures weighing less than 50 pounds.
 - 3. Medium Security, and Maximum Security Fluorescent Fixtures:
 - a. Support each fluorescent fixture 2 feet long or less at minimum of 4 points (each corner).
 - b. Support each fluorescent fixture over 2 feet long, to 3 feet long at a minimum of 6 points (each corner and midway along each side of longest axis).
 - c. Support each fluorescent fixture over 3 feet long, to 8 foot long at minimum of 8 points (each corner, and 2 supports spaced equally along each side of longest axis).
 - d. Outlet box shall not be counted as a point of support.
 - 4. Metal Halide, LED fixtures, and High Pressure Sodium Fixtures:
 - a. Commercial and Industrial Style: Support fixture at 2 points (Support arm mounted style at 4 points).
 - b. An adequately supported outlet box may be used as one point of support for fixtures weighing less than 50 pounds.
 - 5. Commercial and Industrial Incandescent Fixtures: Support fixture from adequately supported outlet box, to suit fixture design (fixture weight less than 50 pounds).

3.06 CHANNEL SUPPORT SYSTEM SCHEDULE

- A. Use channel support system where specified or indicated on the drawings.

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- B. Channel supports may be used, as approved, to accommodate mounting of equipment.
- C. Material and Finish:
 - 1. Dry Locations: Use 12 gage steel channel support system having any one of the specified finishes.
 - 2. Damp Locations: Use 12 gage steel channel support system having any one of the specified finishes except green epoxy/enamel.
 - 3. Wet Locations: Use 12 gage steel channel support system having hot dipped galvanized, or PVC finish.

END OF SECTION

SECTION 16121
WIRING, GENERAL – 600 VOLTS AND UNDER

PART 1 GENERAL

1.01 SUBMITTALS

- A. Data: Catalog sheets, specifications and installation instructions.

1.02 PRODUCT DELIVERY

- A. Mark and tag insulated conductors and cables for delivery to the site. Include:
1. Contractor's name.
 2. Date of manufacture (month & year).
 3. Manufacturer's name.
 4. Data which explains the meaning of coded identification (UL assigned electrical reference numbers, UL assigned combination of color marker threads, etc.).
 5. Environmental suitability information (listed or marked "sunlight resistant" where exposed to direct rays of sun; wet locations listed/marked for use in wet locations; other applications listed/marked suitable for the applications).

PART 2 PRODUCTS

2.01 INSULATED CONDUCTORS AND CABLES

- A. Date of Manufacture: No insulated conductor more than one year old when delivered to the site will be acceptable.
- B. Acceptable Companies: American Insulated Wire Corp., BICC General Cable Industries Inc., Cerro Wire & Cable Co. Inc., Pirelli Cable Corp., or Southwire Co.
- C. Conductors: Annealed uncoated copper or annealed coated copper in conformance with the applicable standards for the type of insulation to be applied on the conductor. Conductor sizes No. 8 and larger shall be stranded.
- D. Types:
1. Electric Light and Power Wiring:
 - a. General: Rated 600V, NFPA 70 Type FEP, THHN, THW, THW-2, THWN, THWN-2, XHH, XHHW, XHHW-2.
 - b. Metal-Clad Cable, NFPA 70 Article 334 Type MC:
 - 1) Interlocked flexible galvanized steel armor sheath, conforming to UL requirements for type MC metal clad cable.
 - 2) Insulated copper conductors, suitable for 600 volts, rated 90°C, one of the types listed in NFPA 70 Table 310-13 or of a type identified for use in Type MC cable.
 - 3) Internal full size copper ground conductor with green insulation.
 - 4) Acceptable Companies: AFC Cable Systems Inc., Coleman Cable Co.
 - 5) Connectors for MC cable: AFC Fitting Inc.'s AFC Series,

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Arlington Industries Inc.'s Saddle grip, or Thomas & Betts Co.'s Tite-Bite with anti-short bushings.

2. Class 1 Wiring:
 - a. No. 18 and No. 16 AWG: Insulated copper conductors suitable for 600 volts, NFPA 70 types KF-2, KFF-2, PAFF, PF, PFF, PGF, PGFF, PTF, SF-2, SFF-2, TF, TFF, TFN, TFFN, ZF, or ZFF.
 - b. Larger than No. 16 AWG: Insulated copper conductors suitable for 600 volts, in compliance with NFPA 70 Article 310.
 - c. Conductor with other types and thickness of insulation may be used if listed for Class 1 circuit use.
3. Class 2 Wiring:
 - a. Multiconductor Cables: NFPA 70 Article 725, Types CL2P, CL2R, CL2.
 - b. Other types of cables may be used in accordance with NFPA 70 Table 725-61 "Cable Uses and Permitted Substitutions", as approved.
4. Class 3 Wiring:
 - a. Single Conductors No. 18 and No. 16 AWG: Same as Class 1 No. 18 and No. 16 AWG conductors except that:
 - 1) Conductors are also listed as CL3.
 - 2) Voltage rating not marked on cable except where cable has multiple listings and voltage marking is required for one or more of the listings.
 - b. Multiconductor Cables: NFPA 70 Article 725, Types CL3P, CL3R, CL3.
 - c. Other types of cables may be used in accordance with NFPA 70, Table 725-61 "Cable Uses and Permitted Substitutions", as approved.

2.02 CONNECTORS

- A. General:
 1. Connectors specified are part of a system. Furnish connectors and components, and use specific tools and methods as recommended by connector manufacturer to form complete connector system.
 2. Connectors shall be UL 486 A listed, or UL 486 B listed for combination dual rated copper/aluminum connectors (marked AL7CU for 75 degrees C rated circuits and AL9CU for 90 degrees C rated circuits).
- B. Splices:
 1. Spring Type:
 - a. Rated 105° C, 600V; Buchanan/Ideal Industries Inc.'s B-Cap, Electrical Products Div./3M's Scotchlok Type Y, R, G, B, O/B+, R/Y+, or B/G+, or Ideal Industries Inc.'s Wing Nuts or Wire Nuts.
 - b. Rated 150° C, 600V; Ideal Industries Inc.'s High Temperature Wire-Nut Model 73B, 59B.
 2. Indent Type with Insulating Jacket:
 - a. Rated 105° C, 600V; Buchanan/Ideal Industries Inc.'s Crimp Connectors, Ideal Industries Inc.'s Crimp Connectors, Penn-Union Corp.'s Penn-Crimps, or Thomas & Betts Corp.'s STA-KON.
 3. Indent Type (Uninsulated): Anderson/Hubbell's Versa-Crimp, VERSAtile,

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- Blackburn/T&B Corp.'s Color-Coded Compression Connectors, Electrical Products Div./3M's Scotchlok 10000, 11000 Series, Framatome Connectors/Burndy's Hydent, Penn-Union Corp.'s BCU, BBCU Series, or Thomas & Betts Corp.'s Compression Connectors.
4. Connector Blocks: NIS Industires Inc.'s Polaris System, or Thomas & Betts Corp.'s Blackburn AMT Series.
 5. Resin Splice Kits: Electrical Products Div./3M's Scotchcast Brand Kit Nos. 82A Series, 82-B1 or 90-B1, or Scotchcast Brand Resin Pressure Splicing Method.
 6. Heat Shrinkable Splices: Electrical Products Div./3M's ITCSN, Raychem Corp.'s Thermofit Type WCS, or Thomas & Betts Corp.'s SHRINK-KON Insulators.
 7. Cold Shrink Splices: Electrical Products Div./3M's 8420 Series.
- C. Gutter Taps: Anderson/Hubbell's GP/GT with GTC Series Covers, Blackburn/T&B Corp.'s H-Tap Type CF with Type C Covers, Framatome Connectors/Burndy's Polytap KPU-AC, H-Crimpit Type YH with CF-FR Series Covers, ILSCO's GTA Series with GTC Series Covers, Ideal Industries Inc.'s Power-Connect GP, GT Series with GIC covers, NSI Industries Inc.'s Polaris System, OZ/Gedney Co.'s PMX or PT with PMXC, PTC Covers, Penn-Union Corp.'s CDT Series, or Thomas & Betts Corp.'s Color-Keyed H Tap CHT with HTC Covers.
- D. Terminals: Nylon insulated pressure terminal connectors by Amp-Tyco/Electronics, Electrical Products Div./3M, Framatome Connectors/Burndy, Ideal Industries Inc., Panduit Corp., Penn-Union Corp., Thomas & Betts Corp., or Wiremold Co.
- E. Lugs:
1. Single Cable (Compression Type Lugs): Copper, one or 2 hole style (to suit conditions), long barrel; Anderson/Hubbell's VERSAtile VHCL, Blackburn/T&B Corp.'s Color-Coded CTL, LCN, Framatome Connectors/Burndy's Hylug YA, Electrical Products Div./3M Scotchlok 31036 or 31145 Series, Ideal Industries Inc.'s CCB or CCBL, NSI Industries Inc.'s L, LN Series, Penn-Union Corp.'s BBLU Series, or Thomas & Betts Corp.'s 54930BE or 54850BE Series.
 2. Multiple Cable (Mechanical Type Lugs): Copper, configuration to suit conditions; Framatome Connectors/Burndy's Qiklug Series, NSI Industries Inc.'s Type TL, Penn-Union Corp.'s VI-TITE Terminal Lug Series, or Thomas & Betts Corp.'s Color-Keyed Locktite Series.
- 2.03 TAPES
- A. Insulation Tapes:
1. Plastic Tape: Electrical Products Div./3M's Scotch Super 33+ or Scotch 88, Plymouth Rubber Co.'s Plymouth/ Bishop Premium 85CW.
 2. Rubber Tape: Electrical Products Div./3M's Scotch 130C, or Plymouth Rubber Co.'s Plymouth/Bishop W963 Plysafe.
- B. Moisture Sealing Tape: Electrical Products Div./3M's Scotch 2200 or 2210, or Plymouth Rubber Co.'s Plymouth/Bishop 4000 Plyseal-V.

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- C. Electrical Filler Tape: Electrical Products Div./3M's Scotchfil, or Plymouth Rubber Co.'s Plymouth/Bishop 125 Electrical Filler Tape.
- D. Color Coding Tape: Electrical Products Div./3M's Scotch 35, or Plymouth Rubber Co.'s Plymouth/Bishop Premium 37 Color Coding.
- E. Arc Proofing Tapes:
 - 1. Arc Proofing Tape: Electrical Products Div./3M's Scotch 77, Mac Products Inc.'s AP Series, or Plymouth Rubber Co.'s Plymouth/Bishop 53 Plyarc.
 - 2. Glass Cloth Tape: Electrical Products Div./3M's Scotch 27/Scotch 69, Mac Products Inc.'s TAPGLA 5066., or Plymouth Rubber Co.'s Plymouth/Bishop 77 Plyglas.
 - 3. Glass-Fiber Cord: Mac Products Inc's MAC 0527.

2.04 WIRE-PULLING COMPOUNDS

- A. To suit type of insulation; American Polywater Corp.'s Polywater Series, Electric Products Div./3M's WL, WLX, or WLW, Greenlee Textron Inc.'s Y-ER-EAS, Cable Cream, Cable Gel, Winter Gel, Ideal Industries Inc.'s Yellow 77, Aqua-Gel II, Agua-Gel CW, or Thomas & Betts Corp.'s Series 15-230 Cable Pulling Lubricants, or Series 15-631 Wire Slick.

2.06 TAGS

- A. Precision engrave letters and numbers with uniform margins, character size minimum 3/16 inches high.
 - 1. Phenolic: Two color laminated engraver's stock, 1/16 inch minimum thickness, machine engraved to expose inner core color (white).
 - 2. Aluminum: Standard aluminum alloy plate stock, minimum .032 inches thick, engraved areas enamel filled or background enameled with natural aluminum engraved characters.

2.07 WIRE MANAGEMENT PRODUCTS

- A. Cable Clamps and Clips, Cable Ties, Spiral Wraps, etc: Catamount/T&B Corp., or Ideal Industries Inc.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install conductors in raceways after the raceway system is completed. Exceptions: Type MC, or other type specifically indicated on the drawings not to be installed in raceways.
- B. No grease, oil, or lubricant other than wire-pulling compounds specified may be used to facilitate the installation of conductors.

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3.02 CIRCUITING

- A. Do not change, group or combine circuits other than as indicated on the drawings.

3.03 COMMON NEUTRAL CONDUCTOR

- A. A common neutral shall not be used for 2 or 3 branch circuits.

3.04 CONDUCTOR SIZE

- A. Conductor Size:
1. For Electric Light and Power Branch Circuits: Install conductors of size shown on drawings. Where size is not indicated, the minimum size allowed is No. 12 AWG.
 2. For Class 1 Circuits:
 - a. No. 18 and No. 16 AWG may be used provided they supply loads that do not exceed 6 amps (No. 18 AWG), or 8 amps (No. 16 AWG).
 - b. Larger than No. 16 AWG: Use to supply loads not greater than the ampacities given in NFPA 70 Section 310-15.
 3. For Class 2 Circuits: Any size to suit application.
 4. For Class 3 Circuits: Minimum No. 18 AWG.

3.05 COLOR CODING

- A. Color Coding for 208/120 Volt and 240/120 Volt Electric Light and Power Wiring:
1. Color Code:
 - a. 2 wire circuit - black, white.
 - b. 3 wire circuit - black, red, white.
 - c. 4 wire circuit - black, red, blue, white.
 2. White to be used only for an insulated grounded conductor (neutral). If neutral is not required use black and red, or black, red and blue for phase to phase circuits.
 - a. "White" for Sizes No. 6 AWG or Smaller:
 - 1) Continuous white outer finish, or:
 - 2) Three continuous white stripes on other than green insulation along its continuous length.
 - b. "White" for Sizes Larger Than No. 6 AWG:
 - 1) Continuous white outer finish, or:
 - 2) Three continuous white stripes on other than green insulation along its continuous length, or:
 - 3) Distinctive white markings (color coding tape) encircling the conductor, installed on the conductor at time of its installation. Install white color coding tape at terminations, and at 1' 0" intervals in gutters, pullboxes, and manholes.
 3. Colors (Black, Red, Blue):
 - a. For Branch Circuits: Continuous color outer finish.
 - b. For Feeders:
 - 1) Continuous color outer finish, or:

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- 2) Color coding tapes encircling the conductors, installed on the conductors at time of their installation. Install color coding tapes at terminations, and at 1' 0" intervals in gutter, pullboxes, and manholes.
- B. Color Coding For 277/480 Volt Electric Light and Power Wiring:
1. Color Code:
 - a. 2 wire circuit – brown, gray.
 - b. 3 wire circuit – brown, yellow, gray.
 - c. 4 wire circuit – brown, yellow, orange, gray.
 2. Gray to be used only for an insulated grounded conductor (neutral). If neutral is not required use brown and yellow, or brown, yellow and orange for phase to phase circuits.
 - a. "Gray" For Sizes No. 6 AWG or Smaller.
 - 1) Continuous gray outer finish.
 - b. "Gray" For Sizes Larger Than No. 6 AWG:
 - 1) Distinctive gray markings (color coding tape) encircling the conductor, installed on the conductor at time of its installation. Install gray color coding tape at terminations, and at 1' 0" intervals in gutters, pullboxes, and manholes.
 - c. Colors (Brown, Yellow, Orange):
 - d. For Branch Circuits: Continuous color outer finish.
 - e. For Feeders:
 - 1) Continuous color outer finish, or:
 - 2) Color coding tapes encircling the conductors, installed on the conductors at the time of their installation. Install color coding tapes at terminations, and at 1' 0" intervals in gutters, pullboxes, and manholes.
- C. More Than One Nominal Voltage System Within A Building: Permanently post the color coding scheme at each branch-circuit panelboard.
- D. Existing Color Coding Scheme: Where an existing color coding scheme is in use, match the existing color coding if it is in accordance with the requirements of NFPA 70.
- E. Color Code For Wiring Other Than Electric Light and Power: In accordance with ICEA/NEMA WC-30 "Color Coding of Wires and Cables". Other coding methods may be used, as approved.
- 3.06 IDENTIFICATION
- A. Identification Tags: Use tags to identify feeders and designated circuits. Install tags so that they are easily read without moving adjacent feeders or requiring removal of arc proofing tapes. Attach tags with non-ferrous wire or brass chain.
1. Interior Feeders: Identify each feeder in pullboxes and gutters. Identify by feeder number and size.
 2. Exterior Feeders: Identify each feeder in manholes and in interior pullboxes and

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gutters. Identify by feeder number and size, and also indicate building number and panel designation from which feeder originates.

3. Street and Grounds Lighting Circuits: Identify each circuit in manholes and lighting standard bases. Identify by circuit number and size, and also indicate building number and panel designation from which circuit originates.

- B. Identification Plaque: Where a building or structure is supplied by more than one service, or has any combination of feeders, branch circuits, or services passing through it, install a permanent plaque or directory at each service, feeder and branch circuit disconnect location denoting all other services, feeders, or branch circuits supplying that building or structure or passing through that building or structure and the area served by each.
- C All control wires shall be labeled with distinct identifiers and a legend shall be given to the owner at the completion of the job.

3.07 WIRE MANAGEMENT

- A. Use wire management products to bundle, route, and support wiring in junction boxes, pullboxes, wireways, gutters, channels, and other locations where wiring is accessible.

3.08 EQUIPMENT GROUNDING CONDUCTOR

- A. Install equipment grounding conductor:
 1. Where specified in other Sections or indicated on the drawings.
 2. In conjunction with circuits recommended by equipment manufacturers to have equipment grounding conductor.
- B. Equipment grounding conductor is not intended as a current carrying conductor under normal operating circumstances.
- C. Color Coding For Equipment Grounding Conductor:
 1. Color Code: Green.
 2. "Green" For sizes No. 6 AWG or Smaller:
 - a. Continuous green outer finish, or:
 - b. Continuous green outer finish with one or more yellow stripes, or:
 - c. Bare copper (see exception below).
 3. "Green" For Sizes Larger Than No. 6:
 - a. Stripping the insulation or covering from the entire exposed length (see exception below).
 - b. Marking the exposed insulation or covering with green color coding tapes.
 - c. Identify at each end and at every point where the equipment grounding conductor is accessible.

3.09 SPECIAL GROUNDING CONDUCTORS

- A. Technical Power System Grounding (Equipment grounding conductor isolated from the premises grounded conductor except at a single grounded termination point): Install an

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insulated grounding conductor running with the circuit conductors for isolated receptacles or utilization equipment requiring an isolated ground:

1. Color Code: Green.
2. “Green” For Isolated Grounding Conductor:
 - a. Continuous green outer finish, or:
 - b. Continuous green outer finish with one or more yellow stripes, and:
 - c. Different than the “green” used for the equipment grounding conductor run with the circuit (where required).
3. Install label at every point where the conductor is accessible, identifying it as an “Isolated Grounding Conductor”.

3.10 ARC PROOFING

- A. Arc proof feeders installed in a common pullbox or manhole as follows:
 1. Arc proof new feeders.
 2. Arc proof existing feeders that are spliced to new feeders.
 3. Arc proof each feeder as a unit (except feeders consisting of multiple sets of conductors).
 4. Arc proof feeders consisting of multiple sets of conductors by arc proofing each set of conductors as a unit.
 5. Arc proof feeders with half-lapped layer of 55 mils thick arc proofing tape and random wrapped or laced with glass cloth tape or glass-fiber cord. For arc proofing tape less than 55 mils thick, add layers to equivalent of 55 mils thick arc proofing tape.

3.11 INSULATED CONDUCTOR AND CABLE SCHEDULE - TYPES AND USE

- A. Electric Light and Power Circuits:
 1. FEP, THHN, THW, THW-2, THWN, THWN-2, XHH, XHHW, or XHHW-2: Wiring in dry or damp locations (except where special type insulation is required).
 2. THWN, THWN-2, XHHW, XHHW-2, USE, or USE-2: Wiring in wet locations (except where type USE or USE-2 insulated conductors are specifically required, or special type insulation is required).
 3. THHN, THWN or THWN-2: Wiring installed in existing raceway systems (except where special type insulation is required).
 4. THHN, THW-2, THWN-2, XHHW, or XHHW-2: Wiring for electric discharge lighting circuits (fluorescent, HID), except where fixture listing requires wiring rated higher than 90° C.
 5. USE, or USE-2: Wiring indicated on the drawings to be direct burial in earth.
 6. USE, or USE-2 Marked “Sunlight Resistant”:
 - a. Service entrance wiring from overhead service to the service equipment.
 - b. Wiring exposed to the weather and unprotected (except where special type insulation is required).
 7. MC:
 - a. Branch circuit wiring in movable metal partitions.
 - 1) Install conductors in accordance with partition manufacturer’s recommendations.

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- C. Class 1 Circuits: Use Class 1 wiring specified in Part 2 (except where special type insulation is required).
- D. Class 2 Circuits: Use Class 2 wiring specified in Part 2 (except where special type insulation is required).
- E. Class 3 Circuits: Use Class 3 wiring specified in Part 2 (except where special type insulation is required).

3.12 CONNECTOR SCHEDULE - TYPES AND USE

- A. Temperature Rating: Use connectors that have a temperature rating, equal to, or greater than the temperature rating of the conductors to which they are connected.
- B. Splices: Splices shall be used in lighting and 120V receptacle wiring only, and shall only be made in junction boxes:
 - 1. Dry Locations:
 - a. For Conductors No. 8 AWG or Smaller: Use spring type pressure connectors, indent type pressure connectors with insulating jackets, or connector blocks (except where special type splices are required) .
 - b. For Conductors No. 6 AWG or Larger: Use connector blocks or uninsulated indent type pressure connectors. Fill indentions in uninsulated connectors with electrical filler tape and apply insulation tape to insulation equivalent of the conductor, or insulate with heat shrinkable splices or cold shrink splices.
 - c. Gutter Taps in Panelboards: For uninsulated type gutter taps fill indentions with electrical filler tape and apply insulation tape to insulation equivalent of the conductor, or insulate with gutter tap cover.
 - 2. Damp Locations: As specified for dry locations, except apply moisture sealing tape over the entire insulated connection (moisture sealing tape not required if heat shrinkable splices or cold shrink splices are used).
 - 3. Wet Locations: Use uninsulated indent type pressure connectors and insulate with resin splice kits, cold shrink splices or heat shrinkable splices. Exception: Splices above ground which are totally enclosed and protected in NEMA 3R, 4, 4X enclosures may be spliced as specified for damp locations.
- C. Terminations:
 - 1. For Conductors No. 10 AWG or Smaller: Use terminals for:
 - a. Connecting wiring to equipment designed for use with terminals.
 - 2. For Conductors No. 8 AWG or Larger: Use compression or mechanical type lugs for:
 - a. Connecting cables to flat bus bars.
 - b. Connecting cables to equipment designed for use with lugs.
 - 3. For Conductor Sizes Larger than Terminal Capacity on Equipment: Reduce the larger conductor to the maximum conductor size that terminal can accommodate (reduced section not longer than one foot). Use compression or mechanical type

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connectors suitable for reducing connection.

END OF SECTION

SECTION 16131
EXPOSED CONDUIT – WET LOCATIONS

PART 1 GENERAL

1.01 REFERENCES

- A. NEMA, ANSI, and UL.

1.02 SUBMITTALS

- A. Product Data: Catalog sheets, specifications and installation instructions.

1.03 MAINTENANCE

- A. Spare Parts: Furnish the following items in the manufacturer's original containers labeled with the names of the items and locations where the items would be used. Store them at the site where directed:
 - 1. Touch up coating compound for plastic coated rigid metal conduit (one spray type can and one non-spray can with brush top).

PART 2 PRODUCTS

2.01 RACEWAYS

- A. Rigid Ferrous Metal Conduit: Steel, hot dipped galvanized on the outside and inside UL categorized as Rigid Ferrous Metal Conduit (identified on UL Listing Mark as Rigid Metal Conduit - Steel, or Rigid Steel Conduit), by Allied Tube & Conduit Corp., LTV Copperweld, or Wheatland Tube Co.
- B. Liquid-tight Flexible Metal Conduit: UL categorized as liquid-tight flexible metal conduit (identified on UL Listing Mark as Liquid-Tight Flexible Metal Conduit, also specifically marked with temperature and environment application data), by AFC Cable Systems Inc., Anamet Electrical Inc., Electri-Flex Co., or Universal Metal Hose Co.
- C. Plastic Coated Rigid Metal Conduit, Fittings, and Accessories: Rigid ferrous metal conduit, fittings and accessories coated with 40 mils thick polyvinylchloride coating; Ocal/T&B Corp.'s Ocal-Blue System, PCD Inc.'s KorKap, KorKap XL, or Robroy Industries' Plastibond or Perma-Cote System.

2.02 FITTINGS AND ACCESSORIES

- A. Connectors and Couplings:
 - 1. Couplings (For Rigid Metal Conduit): Standard threaded couplings as furnished by conduit manufacturer.
 - 2. Watertight Conduit Hubs: Cooper/Crouse Hinds' Myers Hubs (stainless steel), OZ/Gedney Co.'s Type CH-T (hot dipped galvanized finish).
 - 3. Liquid-tight Flexible Metal Conduit Connectors: OZ/Gedney Co.'s 4Q-TG Series (hot-dip/mechanically galvanized), or Thomas & Betts Corp.'s 3322 Series (PVC coated).

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- B. Conduit Bodies (Threaded): Malleable iron or cast iron alloy bodies and covers with hot dipped galvanized or other specified corrosion resistant finish; Cooper/Crouse-Hinds' Condulets (Corro-free epoxy powder coat), Thomas & Betts Corp.'s Conduit Bodies (hot dipped galvanized), or OZ/Gedney Co.'s Conduit Bodies (hot dipped galvanized). Stainless steel cover screws, covers gasketed to suit application.
- C. Expansion Fittings: Cooper/Crouse-Hinds XJG (Corro-free epoxy powder coat), OZ Gedney Co.'s AX, EXE (end type, hot dipped galvanized), or Thomas & Betts Corp.'s XJG (hot dipped galvanized).
- D. Deflection Fittings: Ductile iron couplings with hot dipped galvanized finish, neoprene sleeve, and stainless steel bands, Appleton Electric Co.'s CF; or bronze couplings, neoprene sleeve, and stainless steel bands, OZ/Gedney Co.'s Type DX.
- E. Sealing Fittings: Malleable iron body with hot dipped/mechanically galvanized finish, neoprene sleeve, and stainless steel bands, Appleton electric Co.'s CF; or bronze couplings, neoprene sleeve, and stainless steel bands, OZ/Gedney Co.'s Type DX.
 - 1. Horizontal: Cooper/Crouse-Hinds' EYS with Chico A sealing compound and Chico X filler, OZ/Gedney Co.'s EYD with EYC sealing compound and EYF damming fiber, or Thomas & Betts Corp.'s. EYS w/Chico A sealing compound and Chico X filler.
 - 2. Vertical (with Drain): Cooper/Crouse-Hinds with Chico A sealing compound and Chico X filler, OZ/Gedney Co.'s EY, EYA with EYC sealing compound and EYF damming fiber, or Thomas & Betts Corp.'s. w/Chico A sealing compound and Chico X filler.
 - 3. Other Type Fittings. As required to suit installation requirements, by Cooper/Crouse-Hinds, OZ/Gedney Co., or Thomas & Betts Corp. with hot dipped/mechanically galvanized finish or epoxy powder coat.
- F. Conduit Clamps and Back Spacers: Malleable iron, hot dipped/mechanically galvanized finish; Cooper/Crouse-Hinds' 510 and CB1 Series, OZ/Gedney Co.'s 14-G and 141G Series, or Thomas & Betts Corp.'s 1275 and 1350 Series.
- G. Drains and Breathers: Stainless steel; Appleton Electric Co.'s ECBD, Cooper/Crouse-Hinds' ECD, OZ/Gedney Co.'s Type DB, or Thomas & Betts Corp.'s Type ECD.

PART 3 EXECUTION

3.01 RACEWAY INSTALLATION - GENERAL

- A. Number of Raceways: Do not change number of raceways to less than the number indicated on the drawings.
 - 1. Each raceway shall enclose one circuit unless otherwise indicated on the drawings.
- B. Conduit Size: Not smaller than 1/2 inch electrical trade size. Where type THWN, THWN-2, XHHW, or XHHW-2 conductors are specified for use under Section 16121,

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EXPOSED CONDUIT – WET LOCATIONS

the minimum allowable conduit size for new Work shall be based on Type THW conductors.

- C. Conduit Bends: For 1/2 and 3/4 inch conduits, bends may be made with manual benders. For all conduit sizes larger than 3/4 inch, manufactured or field fabricated offsets or bends may be used. Make field fabricated offsets or bends with an approved hydraulic bender.
- D. Conduit Exposed In Indoor Wet Locations: Install entire wiring system including conduit, boxes, and fittings so that there is a 1/4 inch air space between it and the wall or supporting surface.
- E. Conduit in Hazardous Areas: Install Work in hazardous areas in accordance with NFPA 70. The hazardous areas and the degree of hazard for each area are indicated on the drawings.

3.02 RACEWAY SCHEDULE - TYPES & USE

- A. Rigid Ferrous Metal Conduit: Install in pump and mechanical elevations 251.00 through 274.00, and in control room elevation 274.00 through 284.00. Install in all wet locations unless otherwise specified or indicated on the drawings.
- B. Liquid-tight Flexible Metal Conduit: Install equipment grounding conductor in liquid-tight flexible metal conduit and bond at each box or equipment to which conduit is connected:
 - 1. Use 1 to 3 feet of liquid-tight flexible metal conduit (UL listed and marked for the installation's temperature and environmental conditions) for final conduit connection to:
 - a. Motors with weather-protected or totally enclosed housings.
 - b. Equipment subject to vibration.
 - c. Equipment requiring flexible connection for adjustment or alignment.
- C. Plastic Coated Rigid Metal Conduit: Use in the wetwell and all exterior exposed conduit.

3.03 FITTINGS AND ACCESSORIES SCHEDULE

- A. General:
 - 1. Use malleable iron or cast iron alloy fittings and accessories having hot dipped/mechanically galvanized finish or other specified corrosion resistant finish in conjunction with ferrous raceways unless otherwise specified or indicated on the drawings.
 - 2. Use caps or plugs to seal ends of conduits until wiring is installed (to exclude foreign material).
 - 3. Use expansion fittings:
 - a. Where raceways cross expansion joints.
 - b. At intervals not exceeding 75 feet in straight runs (outside installations).
 - c. Between fixed equipment (outside installations).
 - 4. Use deflection fittings where raceways cross expansion joints that move in more than one plane.

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5. Use watertight hub on end of each conduit entering cabinets or boxes that are not constructed with integral threaded hubs.
 6. Use back spacers behind each conduit clamp to keep raceway off surface to which it is attached and arranged to allow raceway to move due to expansion and contraction (outside installations).
 7. Use drains in low points of the system to drain condensation, keeping interior of raceway system free of moisture. Also use breather at high point of the system for outside installations.
- B. For Rigid Metal Conduit: Use threaded fittings.
- C. For Liquid-tight Flexible Metal Conduit: Use liquid-tight connectors.
- D. For Plastic Coated Rigid Metal Conduit: Use conduit manufacturer's PVC coated fittings and accessories.

END OF SECTION

SECTION 16132
INTERIOR RACEWAYS, FITTINGS, AND ACCESSORIES

PART 1 GENERAL

1.01 REFERENCES

- A. NEMA, ANSI, and UL.

1.02 SUBMITTALS

- A. Product Data: Catalog sheets, specifications and installation instructions.

1.03 MAINTENANCE

- A. Spare Parts: Furnish the following items in the manufacturer's original containers labeled with the names of the items and locations where the items would be used. Store them at the site where directed:
 - 1. Touch up coating compound for plastic coated rigid metal conduit (one spray type can and one non-spray can with brush top).

PART 2 PRODUCTS

2.01 RACEWAYS

- A. Rigid Ferrous Metal Conduit: Steel, hot dipped galvanized on the outside and inside, UL categorized as Rigid Ferrous Metal Conduit (identified on UL Listing Mark as Rigid Metal Conduit - Steel or Rigid Steel Conduit), by Allied Tube & Conduit Corp., LTV Copperweld, or Wheatland Tube Co.
- B. Intermediate Ferrous Metal Conduit: Steel, galvanized on the outside and enameled on the inside, UL categorized as Intermediate Ferrous Metal Conduit (identified on UL Listing Mark as Intermediate Metal Conduit or IMC), by Allied Tube & Conduit Corp., LTV Copperweld, or Wheatland Tube Co.
- C. Electrical Metallic Tubing: Steel, galvanized on the outside and enameled on the inside, UL categorized as Electrical Metallic Tubing (identified on UL Listing Mark as Electrical Metallic Tubing), by Allied Tube & Conduit Corp., LTV Copperweld, or Wheatland Tube Co.
- D. Flexible Metal Conduit: Galvanized steel strip shaped into interlocking convolutions, UL categorized as Flexible Metal Conduit (identified on UL Listing Mark as Flexible Steel Conduit or Flexible Steel Conduit Type RW), by AFC Cable Systems Inc., Anamet Electrical Inc., Electri-Flex Co., or International Metal Hose Co.
- E. Liquid-tight Flexible Metal Conduit: UL categorized as liquid-tight flexible metal conduit (identified on UL Listing Mark as Liquid-Tight Flexible Metal Conduit, also specifically marked with temperature and environment application data), by AFC Cable Systems Inc., Anamet Electrical Inc., Electri-Flex Co., or Universal Metal Hose Co.

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- F. Surface Metal Raceway, Fittings and Accessories: By Thomas & Betts Corp., Mono-Systems Inc. or Wiremold Co. Area and conductor capacity indicated for each size raceway is for reference. Follow manufacturer's recommended raceway capacity for all types and sizes of conductors:
1. Size 1: Nominal area .3 sq. in. min., 4 No. 12 THW max.; Thomas & Betts B400, Mono-Systems SMS 700, or Wiremold's V700.
 2. Size 2: Nominal area .75 sq. in. min., 11 No. 12 THW max.; Thomas & Betts SR250, Mono-Systems SMS2100, Wiremold's 2100.
 3. Size 3: Nominal area 2.8 sq. in. min., 43 No. 12 THW max.; Thomas & Betts SR500, Mono-Systems SMS3200, or Wiremold's G3000.
 4. Size 4: Nominal area 7.5 sq. in. min., 119 No. 12 THW max.; Thomas & Betts SR600, Mono-Systems SMS4200, or Wiremold's G4000.
 5. Size 5: Nominal area 15.9 sq. in. min., 252 No. 12 THW max.; Thomas & Betts SR700, Mono-Systems SMS4400, or Wiremold's G6000.
- G. Wireways, Fittings and Accessories:
1. NEMA 1 (Without Knockouts): Hoffman Enclosures Inc. Bulletin F-40, Hubbell/Wegmann's HSK, Lee Products Co.'s S Series, Rittal/Electromate's EW & EWHC Lay-In Wireway System, or Square D Co.'s Square-Duct Class 5100.
- H. Plastic Coated Rigid Metal Conduit, Fittings, and Accessories: Rigid ferrous metal conduit, fittings, and accessories coated with 40 mils thick polyvinylchloride coating; Ocal/T&B Corp.'s Ocal-Blue System, PCD Inc.'s KorKap, KorKap XL, or Robroy Industries' Plasti-bond or Perma-Cote System.

2.02 FITTINGS AND ACCESSORIES

- A. Insulated Bushings:
1. Threaded, malleable iron/zinc electroplate with 105 degrees C minimum plastic insulated throat; Appleton Electric Co.'s BU50I Series, Cooper/Crouse-Hinds' 1031 Series, OZ/Gedney Co.'s IBC-50 Series, Racor Inc.'s 1132 Series, Steel City/T & B Corp.'s BI-901 Series, or Thomas & Betts Corp.'s 1222 Series.
 2. Threaded malleable iron with 150 degrees C plastic throat; Appleton Electric Co.'s BU501 Series, Cooper/Crouse-Hinds' H1031 Series, or OZ/Gedney Co.'s IBC-50 Series.
- B. Plastic Bushings for 1/2 and 3/4 Inch Conduit:
1. 105 degrees C minimum temperature rating; Appleton Electric Co.'s BBU50, BBU75, Blackburn (T & B Corp.'s) 50 BB, 75 BB, Cooper/Crouse-Hinds' 931, 932, or OZ/Gedney Co.'s IB-50, IB-75, Racor Inc.'s 1402, 1403, Steel City/T & B Corp.'s BU-501, BU-502, or Thomas & Betts Corp.'s 222, 223.
 2. 150 degrees C temperature rating; Appleton Electric Co.'s BBU50H, BBU75H, Cooper/Crouse-Hinds' H-931, H-932, or OZ/Gedney Co.'s A-50, A-75.
- C. Insulated Grounding Bushings:
1. Threaded, malleable iron/zinc electroplate with 105 degrees C minimum plastic insulated liner, and ground lug; Appleton Electric Co.'s GIB-50 Series, Cooper/Crouse-Hinds' GLL Series, OZ/Gedney Co.'s IBC-50L Series, Racor

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- Inc.'s 1212 Series, Steel City/T & B Corp.'s BG-801 (1/2 to 2") Series, or Thomas & Betts Corp.'s 3870.
2. Threaded malleable iron/zinc electroplate with 150 degrees C plastic insulated liner, and ground lug; Appleton Electric Co.'s GIB Series, Cooper/Crouse-Hinds' HGLL Series, or OZ/Gedney Co.'s IBC-50L Series, or Thomas & Betts Corp.'s 3870.
- D. Connectors and Couplings:
1. Locknuts: UL, steel/zinc electroplate; Appleton Electric Co.'s BL-50 Series, Cooper/Crouse-Hinds' 11 Series, OZ/Gedney Co.'s 1-50S Series, Racco Inc.'s 1002 Series, Steel City/T&B Corp.'s LN-101 Series, or Thomas & Betts Corp.'s 141 Series.
 2. Grounding Wedge: Thomas & Betts Corp.'s 3650 Series.
 3. Couplings For Rigid Metal and IMC Conduit: Standard galvanized threaded couplings as furnished by conduit manufacturer, Allied Tube & Conduit Corp.'s Kwik-Couple, or Thomas & Betts Corp.'s Shamrock.
 4. Three Piece Conduit Coupling For Rigid Metal and IMC Conduit: Steel, malleable iron, zinc electroplate; Allied Tube & Conduit Corp.'s Kwik-Couple, Appleton Electric Co.'s EC-50 Series, Cooper/Crouse-Hinds' 190M Series, OZ/Gedney Co.'s 4-50 Series, Racco Inc.'s 1502 Series, Steel City/T & B Corp.'s EK-401 Series, or Thomas & Betts Corp.'s 675 Series.
 5. Electrical Metallic Tubing Couplings and Insulated Connectors: Compression type, steel/zinc electroplate; Appleton Electric Co.'s TW-50CS1, TWC-50CS Series, Cooper/Crouse-Hinds' 1650, 660S Series, Racco Inc.'s 2912, 2922 Series, Steel City/T & B Corp.'s TC-711 Series, or Thomas & Betts Corp.'s 5120, 5123 Series.
 6. Flexible Metal Conduit Connectors: Arlington Industries Inc.'s Saddle-Grip, OZ/Gedney Co.'s C-8T, 24-34T, ACV-50T Series, or Thomas & Betts Corp.'s Nylon Insulated Tite-Bite Series.
 7. Liquid-tight Flexible Metal Conduit Connectors: Steel, malleable iron, zinc electroplate, insulated throat; Appleton Electric Co.'s STB Series, Cooper/Crouse-Hinds' LT Series, OZ/Gedney Co.'s 4Q-50T Series, Racco Inc.'s 3512 Series, Steel City/T & B Corp.'s LT-701 Series, or Thomas & Betts Corp.'s 5332 Series.
- E. Conduit Bodies (Threaded):
1. Malleable Iron/Zinc Electroplate: Zinc electroplate malleable iron or cast iron alloy bodies with zinc electroplate steel covers; Appleton Electric Co.'s Unilets, Cooper/Crouse-Hinds' Condulets, OZ/Gedney Co.'s Conduit Bodies, or Thomas & Betts Corp.'s Conduit Bodies.
- F. Expansion Fittings:
1. Malleable Iron, Zinc Electroplate Finish: Appleton Electric Co.'s XJ or OZ/Gedney Co.'s AX (TX for EMT), with external bonding jumper.
 2. Electrogalvanized Steel: Cooper/Crouse-Hinds' XJG (XJG-EMT for EMT), or Thomas & Betts Corp.'s XJG, with internal grounding.
- G. Deflection Fittings: Appleton Electric Co.'s DF, Cooper/Crouse-Hinds' XD, or OZ/Gedney Co.'s Type DX.

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- H. Hazardous Location Fittings:
 - 1. Sealing Fittings: Appleton Electric Co.'s EYS, ESU w/Kwiko sealing compound and fiber filler, Cooper/Crouse-Hinds' EYS, EZS w/Chico A sealing compound and Chico X filler, OZ/Gedney Co.'s EY, EYA with EYC sealing compound and EYF damming fiber, or Thomas & Betts Corp.'s. EYS w/Chico A sealing compound and Chico X filler.
 - 2. Other Type Fittings: As required to suit installation requirements, by Appleton Electric Co., Cooper/Crouse-Hinds, OZ/Gedney Co, or Thomas & Betts Corp.
- I. Sealant for Raceways Exposed to Different Temperatures: Sealing compounds and accessories to suit installation; Appleton Electric Co.'s DUC, or Kwiko Sealing Compound with fiber filler, Cooper/Crouse-Hinds' Chico A Sealing Compound with Chico X fiber, Electrical Products Division 3M Scotch products, OZ Gedney Co.'s DUX or EYC sealing compound with EYF damming fiber, or Thomas & Betts Corp.'s Blackburn DX.
- J. Vertical Conductor Supports: Kellems/Hubbell Inc.'s Conduit Riser Grips, or OZ/Gedney Co.'s Type M, Type R.
- K. Pulling-In-Line For Installation in Spare and Empty Raceways: Polypropylene monofilament utility line; Greenlee Textron Inc.'s Poly Line 430, 431, or Ideal Industries Powr-Fish Pull-Line 31-340 Series.

PART 3 EXECUTION

3.01 RACEWAY INSTALLATION - GENERAL

- A. Number of Raceways: Do not change number of raceways to less than the number indicated on the drawings.
 - 1. Each raceway shall enclose one circuit unless otherwise indicated on the drawings.
- B. Number of Raceways: Do not change number of raceways to less than the number indicated on the drawings except when appropriate for advantageous reuse of existing exposed and concealed raceways (the contract documents do not indicate location, number, size or condition of existing raceways). Existing raceways may be reused if the following conditions are met:
 - 1. The existing raceway must be of adequate size for the new conductors to be installed therein (NFPA 70 Chapter 9, Tables 1, 4, & 5; Appendix C, Tables C1-C12a). More circuits may be enclosed by existing raceways than the circuiting shown on the drawings provided conductor sizes are increased to compensate for derating (adjustment factors) and other considerations required by NFPA 70 Article 310-15.
 - 2. Remove existing conductors.
 - 3. Demonstrate to the Owner's Representative that the existing raceway is clear of obstructions and in good condition.
 - 4. Check ground continuity. When ground continuity of existing raceway is inadequate install insulated grounding bushings, grounding wedges, bonding

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- straps, grounding jumpers or equipment grounding conductors to establish effective path to ground.
5. Install insulated bushings to replace damaged or missing bushings. Replace non-insulated bushings with insulated bushings on raceway sizes 1 inch and larger.
 6. Install vertical conductor supports to replace existing or missing vertical conductor supports.
 7. Install extension rings on existing boxes when the number of new conductors installed therein exceeds NFPA 70 requirements.
 8. Furnish the Owner's Representative with marked up drawings showing size and routing of existing raceways with number and size of new conductors installed therein.
- C. Raceways for Future Use (Spare Raceways and Empty Raceways): Draw fish tape through raceways in the presence of the Owner's Representative to show that the raceway is clear of obstructions.
1. Leave a pulling-in line in each spare and empty raceway.
- D. Conduit Installed Concealed:
1. Where possible install conduit concealed unless otherwise indicated on the drawings.
 2. Existing Construction:
 - a. Run conduit in existing chases and hung ceilings.
 - b. If conduit cannot be installed concealed due to conditions encountered in the building, report such conditions and await approval in writing before proceeding.
 3. New Construction:
 - a. Run conduit in the ceilings, walls, and partitions.
 - b. Install conduit under slabs on grade or under slabs above finished ceilings where indicated on the drawings. Concrete slabs that are both ceilings and floors shall be treated as floor slabs.
 - 1) Conduit Under Slab on Grade:
 - a) Run conduit under vapor barrier, if any.
 - b) Install equipment grounding conductor in each conduit. Bond at boxes and equipment to which conduit is connected.
 - 2) Conduit Under Slab, Above Finished Ceiling:
 - a) Attach conduit to bottom of slab or structure supporting the slab.
 - b) Firestop through-penetrations of the slab.
 4. If any portions of the conduit system cannot be installed concealed due to conditions encountered in the building, report such conditions and await approval in writing before proceeding.
- E. Conduits Penetrating Concrete Floor Slabs (Concrete slabs that are both ceilings and floors shall be treated as floor slabs):
1. Provide a minimum of 2 inches between conduits that vertically penetrate elevated concrete slabs.
- F. Conduit Installed Exposed:
1. Install conduit exposed where indicated on the drawings.

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2. Install conduit tight to the surface of the building construction unless otherwise indicated or directed.
 3. Install vertical runs perpendicular to the floor.
 4. Install runs on the ceiling perpendicular or parallel to the walls.
 5. Install horizontal runs parallel to the floor.
 6. Do not run conduits near heating pipes.
 7. Installation of conduit directly on the floor will not be permitted.
- F. Conduit Size: Not smaller than 1/2 inch electrical trade size. Where type FEP, THHN, THWN, THWN-2, XHH, XHHW, or XHHW-2 conductors are specified for use under Section 16121, the minimum allowable conduit size for new Work shall be based on Type THW conductors.
- G. Conduit Bends: For 1/2 and 3/4 inch conduits, bends may be made with manual benders. For all conduit sizes larger than 3/4 inch, manufactured or field fabricated offsets or bends may be used. Make field fabricated offsets or bends with an approved hydraulic bender.

3.02 RACEWAY INSTALLATION - SPECIAL AREAS

- A. Conduit in Hazardous Areas: Install Work in hazardous areas in accordance with the NFPA 70. The hazardous areas and the degree of hazard for each area are indicated on the drawings.
1. Install sealing fittings in concealed conduit runs in a recessed box with blank face plate to match other face plates in the area.

3.03 RACEWAY SCHEDULE

- A. Rigid Ferrous Metal Conduit: Install in pump and mechanical elevations 251.00 through 274.00, and in control room elevation 274.00 through 284.00. Install in all wet locations unless otherwise specified or indicated on the drawings.
- B. Intermediate Ferrous Metal Conduit: May be installed in all dry and damp locations except:
1. Hazardous areas.
 2. Where other type raceways are specified or indicated on the drawings.
- C. Electrical Metallic Tubing:
1. May be installed concealed as branch circuit conduits above suspended ceilings where conduit does not support fixtures or other equipment.
 2. May be installed concealed as branch circuit conduits in hollow areas in dry locations, including:
 - a. Hollow concrete masonry units, except where cores are to be filled.
 - b. Drywall construction with sheet metal studs, except where studs are less than 3-1/2 inches deep.
- D. Flexible Metal Conduit: Install equipment grounding conductor in the flexible metal conduit and bond at each box or equipment to which conduit is connected:

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1. Use for final conduit connection to recessed lighting fixtures in suspended ceilings. Use 4 to 6 feet of flexible metal conduit, minimum size 1/2 inch, between junction box and fixture. Locate junction box at least 1 foot from fixture and accessible if the fixture is removed.
 2. Use 1 to 3 feet of flexible metal conduit for final conduit connection to:
 - a. Dry type transformers.
 - b. Non-Process Equipment subject to vibration (dry locations).
 - c. Non-Process Equipment requiring flexible connection for adjustment or alignment (dry locations).
 3. Use for concealed branch circuit conduits above existing non-removable suspended ceilings where rigid type raceways cannot be installed due to inaccessibility of space above ceiling.
 4. May be installed concealed as branch circuit conduits in drywall construction with sheet metal studs, except where studs are less than 3-1/2 inches deep.
- E. Liquid-tight Flexible Metal Conduit: Install equipment grounding conductor in liquid-tight flexible metal conduit and bond at each box or equipment to which conduit is connected:
1. Use 1 to 3 feet of liquid-tight flexible metal conduit (UL listed and marked suitable for the installation's temperature and environmental conditions) for final conduit connection to:
 - a. Motors with weather-protected or totally enclosed housings.
 - b. Equipment subject to vibration (damp and wet locations).
 - c. Equipment requiring flexible connection for adjustment or alignment (damp and wet locations).
- F. Surface Metal Raceway: Use as exposed raceway system in finished spaces at locations indicated on the drawings.
1. Use surface metal raceway system of size required for number of wires to be installed therein. Use specific size when indicated on the drawings.
 2. Do not run raceway through walls that have a plaster finish nor through masonry walls or floors. Install a pipe sleeve, or a short length of conduit with junction boxes or adapter fittings for raceway runs through such areas. Run raceway along top of baseboards, care being taken to avoid telephone and other signal wiring. Where raceway crosses chair railing or picture molding, cut the chair railing or picture molding to permit the raceway to lie flat against the wall. Run raceway around door frames and other openings. Run raceway on ceiling or walls perpendicular to or parallel with walls and floors.
 3. Secure raceway at intervals not exceeding 36 inches.
 4. Install separate equipment grounding conductor for grounding of equipment. The raceway alone will not be considered suitable for use as an effective path to ground.
 5. Outlet box covers for pendant mounted fluorescent fixtures may be omitted if the fixture canopy is notched to receive the raceway and the canopy fits snugly against the ceiling.
 6. Where equipment is mounted on an outlet box and the equipment base is larger than the outlet box, provide finishing collar around equipment base and outlet box or provide finishing collar/outlet box:

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- a. Finishing Collar: Same finish and peripheral dimensions as the equipment base, including provisions for mounting, slots to fit over raceway and of depth to cover outlet box and extend back to ceiling or wall.
 - b. Combination Finishing Collar/Outlet Box: Same finish and peripheral dimensions as the equipment base to be mounted thereon, gage or thickness of metal as required by NFPA 70, including provision for mounting and knockouts for entrance of raceway.
- G. Wireways: May be used indoors in dry locations for exposed raceway between grouped, wall mounted equipment.
- H. Plastic Coated Rigid Metal Conduit: Use in the wetwell and all exterior exposed conduit.

3.04 FITTINGS AND ACCESSORIES SCHEDULE

- A. General:
 - 1. Use fittings and accessories that have a temperature rating equal to, or higher than the temperature rating of the conductors to be installed within the raceway.
 - 2. Use zinc electroplate or hot dipped galvanized steel/malleable iron or cast iron alloy fittings and accessories in conjunction with ferrous raceways in dry and damp locations unless otherwise specified or indicated on the drawings.
 - 3. Use insulated grounding bushings or grounding wedges on ends of conduit for terminating and bonding equipment grounding conductors, when required, if cabinet or boxes are not equipped with grounding/bonding screws or lugs.
 - 4. Use caps or plugs to seal ends of conduits until wiring is installed to exclude foreign material.
 - 5. Use insulated grounding bushings on the ends of conduits that are not directly connected to the enclosure, such as stub-ups under equipment, etc., and bond between bushings and enclosure with equipment grounding conductor.
 - 6. Use expansion fittings where raceways cross expansion joints (exposed, concealed, buried).
 - 7. Use deflection fittings where raceways cross expansion joints that move in more than one plane.
 - 8. Use 2 locknuts and an insulated bushing on end of each conduit entering sheet metal cabinet or box in dry or damp locations.
 - a. Plastic bushing may be used on 1/2 and 3/4 inch conduit in lieu of insulated bushing.
 - b. Terminate conduit ends within cabinet/box at the same level.
- B. For Rigid and Intermediate Metal Conduit: Use threaded fittings and accessories. Use 3 piece conduit coupling where neither piece of conduit can be rotated.
- C. For Electrical Metallic Tubing: Use compression type connectors and couplings.
- D. For Flexible Metal Conduit: Use flexible metal conduit connectors.
- E. For Liquid-tight Flexible Metal Conduit: Use liquid-tight connectors.

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- F. For Surface Metal Raceway: Use raceway manufacturer's standard fittings and accessories.
- G. For Wireways: Use wireway manufacturer's standard fittings and accessories.
- H. For Plastic Coated Rigid Metal Conduit: Use conduit manufacturer's PVC coated fittings and accessories.

END OF SECTION

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OUTLET, JUNCTION, AND PULL BOXES

PART 1 GENERAL

1.01 REFERENCES

- A. NEMA, and UL.

1.02 SUBMITTALS

- A. Product Data: Catalog sheets, specifications and installation instructions.
 - 1. For fire rated construction, prove that materials and installation methods proposed for use are in accordance with the listing requirements of the classified construction.

PART 2 PRODUCTS

2.01 GALVANIZED STEEL OUTLET BOXES

- A. Standard galvanized steel boxes and device covers by Appleton Electric Co., Beck Mfg./Picoma Industries, Cooper/Crouse-Hinds, Raco/Div. of Hubbell, or Steel City/T & B Corp.

2.02 GALVANIZED STEEL JUNCTION AND PULL BOXES

- A. Code gage, galvanized steel screw cover boxes by Delta Metal Products Inc., Hoffman Enclosures Inc., Hubbell Wiegmann, Lee Products Co., or Rittal/Electromate.

2.03 THREADED TYPE BOXES:

- A. Outlet Boxes:
 - 1. For Dry, Damp Locations: Zinc electroplate malleable iron or cast iron alloy boxes by Appleton Electric Co., Cooper/Crouse-Hinds Co., or OZ/ Gedney Co., with zinc electroplate steel covers to suit application.
 - 2. For Wet Locations: Malleable iron or cast iron alloy boxes with hot dipped galvanized or other specified corrosion resistant finish as produced by Cooper/Crouse-Hinds (hot dipped galvanized or Corro-free epoxy powder coat), or OZ/Gedney Co. (hot dipped galvanized), with stainless steel cover screws, and malleable iron covers gasketed to suit application.
- B. Junction And Pull Boxes:
 - 1. For Dry, Damp Locations: Zinc electroplate cast iron boxes by Appleton Electric Co., Cooper/Crouse-Hinds, or OZ/Gedney Co., with zinc electroplate steel or cast iron cover.
 - 2. For Wet Locations: Cast iron boxes by Cooper/Crouse-Hinds' (hot dipped galvanized or Corro-free epoxy powder coat), or OZ/Gedney Co. (hot dipped galvanized), with stainless steel cover screws and cast iron cover gasketed to suit application.
- C. Conduit Bodies, Threaded (Provided with a Volume Marking):

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1. For Dry, Damp Location: Zinc electroplate malleable iron or cast iron alloy bodies with zinc electroplate steel covers; Appleton Electric Co.'s Unilets, Cooper/Crouse-Hinds' Condulets, or OZ/Gedney Co.'s Conduit Bodies.
2. For Wet Locations: Malleable iron or cast iron alloy bodies with hot dipped galvanized or other specified corrosion resistant finish; Cooper/Crouse-Hinds' Condulets (hot dipped galvanized or Corro-free epoxy power coat), or OZ/Gedney Co.'s Conduit Bodies (hot dipped galvanized) with stainless steel cover screws and malleable iron covers gasketed to suit application.

2.04 CORROSION RESISTANT BOXES

- A. Plastic Coated Outlet and Junction Boxes: Threaded type malleable iron boxes coated with 40 mils thick polyvinylchloride coating; Ocal/T&B Corp.'s Ocal-Blue System, PCD Inc.'s KorKap, KorKap XL, or Robroy Industries' Plastibond or Perma-Cote System.
- B. Non-Metallic Junction and Pullboxes: Glass fiber reinforced polyester; Carlon/Div. of Lamon and Sessions' Himeline Series, Cooper/Crouse-Hinds' Krydon Products, or Robroy Industries' Stahlin Enclosures.

2.05 SPECIFIC PURPOSE OUTLET BOXES

- A. As fabricated by manufacturers for mounting their equipment.

2.06 FINISHING COLLAR OR COMBINATION FINISHING COLLAR/OUTLET BOX
(SURFACE MOUNTED EQUIPMENT USED WITH EXPOSED RACEWAY):

- A. Finishing Collar: Same finish and peripheral dimensions as the equipment base, including provisions for mounting, slots to fit over raceway and of depth to cover outlet box and extend back to ceiling or wall.
- B. Combination Finishing Collar/Outlet Box: Same finish and peripheral dimensions as the equipment base, gage or thickness of metal as required by National Electrical Code, including provisions for mounting, and knockouts or threaded bosses for entrance of raceway.

PART 3 EXECUTION

3.01 PREPARATION

- A. Before proceeding with the installation of junction and pull boxes, check the locations with the Owner's Representative and have same approved.

3.02 INSTALLATION

- A. Mounting Position of Wall Outlets For Wiring Devices: Unless otherwise indicated, install boxes so that the long axis of each wiring device will be vertical.

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- B. Height of Wall Outlets: Unless otherwise indicated, locate outlet boxes with their center lines at the following elevations above finished floor:

Lighting Fixtures	As Indicated on Drawings"
Lighting Fixtures in Stairway	As Indicated on Drawings"
Exit Lights	8'-0" where ceiling height allows a minimum of 6 inch clearance between ceiling and top of exit light. Otherwise mount exit light so that it's top is 6 inches below finished ceiling. Adjust height and clearances as required to suit installation over doors.
Switches	4'-0"
Single & Duplex Receptacles	1'-6"* or as indicated.
Water Cooler Receptacles	2'-0"
Range Receptacle	1'-6"
Special Purpose Receptacles	4'-0"
Thermostats	5'-0"
Manual Fire Alarm Boxes	4'-0"
Audible Notification Appliances	8'-0" where ceiling height allows a minimum of 6 inch clearance between ceiling and top of appliance. Otherwise mount appliance so that it's top is 6 inches below finished ceiling.
Visible Notification Appliances	Install outlet so that the bottom of the visible lens will be 6'-8" AFF.
Combination Audible/Visible Notification Appliances	Install outlet so that the bottom of the visual lens will be 6'-8" AFF, and the audible section will be above the visible section.
Telecommunications	2'-0"
Telephone	2'-0"

*In areas containing heating convectors, install outlets above convectors at height indicated on drawings.

- C. Supplementary Junction and Pull Boxes: In addition to junction and pull boxes indicated on the drawings and required by NFPA 70, provide supplementary junction and pull boxes as follows:
1. When required to facilitate installation of wiring.
 2. At every third 90 degree turn in conjunction with raceway sizes over 1 inch.
 3. At intervals not exceeding 100 feet in conjunction with raceway sizes over 1 inch.

3.03 OUTLET, JUNCTION, AND PULL BOX SCHEDULE

- A. Boxes For Concealed Conduit System:
1. Non-Fire Rated Construction:
 - a. Depth: To suit job conditions and comply with NFPA 70 Article 370.
 - b. For Lighting Fixtures: Use galvanized steel outlet boxes designed for the purpose.
 - 1) For Fixtures Weighing 50 lbs. or Less: Box marked "FOR FIXTURE SUPPORT".

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- 2) For Fixtures More Than 50 lbs: Box listed and marked with the weight of the fixture to be supported (or support fixture independent of the box).
 - c. For Junction and Pull Boxes: Use galvanized steel boxes with flush covers.
 - d. For Switches, Receptacles, Etc:
 - 1) Plaster or Cast-In-Place Concrete Walls: Use 4 inch or 4-11/16 inch galvanized steel boxes with device covers.
 - 2) Walls Other Than Plaster or Cast-In-Place Concrete: Use type of galvanized steel box which will allow wall plate to cover the opening made for the installation of the box.
 - 2. Recessed Boxes in Fire Rated (2 hour maximum) Bearing and Nonbearing Wood or Steel Stud Walls (Gypsum Wallboard Facings):
 - a. Use listed single and double gang metallic outlet and switch boxes. The surface area of individual outlet or switch boxes shall not exceed 16 square inches.
 - b. The aggregate surface area of the boxes shall not exceed 100 square inches per 100 square feet of wall surface.
 - c. Securely fasten boxes to the studs. Verify that the opening in the wallboard facing is cut so that the clearance between the box and the wallboard does not exceed 1/8 inch.
 - d. Separate boxes located on opposite sides of walls or partitions by a minimum horizontal distance of 24 inches. This minimum separation distance may be reduced when wall opening protective materials are installed according to the requirements of their classification.
 - e. Use wall opening protective material in conjunction with boxes installed on opposite sides of walls or partitions of staggered stud construction in accordance with the classification requirements for the protective material.
 - 3. Other Fire Rated Construction: Use materials and methods to comply with the listing requirements for the classified construction.
- B. Boxes For Exposed Conduit System:
- 1. Dry and Damp Locations: Use zinc electroplate or hot dipped galvanized threaded type malleable iron or cast iron alloy outlet, junction, and pullboxes or conduit bodies provided with a volume marking in conjunction with ferrous raceways unless otherwise specified or indicated on the drawings.
 - a. Galvanized steel boxes may be used in conjunction with conduit sizes over 1 inch in non-hazardous dry and damp locations.
 - b. Galvanized steel boxes may be used in conjunction with electrical metallic tubing where it is allowed (specified) to be installed exposed as branch circuit conduits at elevations over 10'-0" above finished floor.
 - 2. Wet Locations: Use threaded type malleable iron or cast iron alloy outlet junction, and pullboxes or conduit bodies (provided with a volume marking) with hot dipped galvanized or other specified corrosion resistant coating in conjunction with ferrous raceways unless otherwise specified or indicated on the drawings.
 - a. Use corrosion resistant boxes in conjunction with plastic coated rigid ferrous metal conduit.

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OUTLET, JUNCTION, AND PULL BOXES

3. Finishing Collar or Combination Finishing Collar/Outlet Box (Surface Mounted Equipment Used With Exposed Raceway):
 - a. Use finishing collar where surface mounted equipment is installed on an exposed raceway outlet box and the equipment base is larger than the outlet box.
 - b. Use combination finishing collar/outlet box where surface mounted equipment is not indicated to be installed on an exposed raceway outlet box, but raceway cannot be run directly into equipment body due to equipment design.
- C. Specific Purpose Outlet Boxes: Use to mount equipment when available and suitable for job conditions. Unless otherwise specified, use threaded type boxes with finish as specified for exposed conduit system, steel (painted) for surface metal raceway system and galvanized steel for recessed installations.

END OF SECTION

SECTION 16137
UNDERGROUND CONDUIT SYSTEM

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Earthwork: Section 02200.
- B. Cast-In-Place Concrete: Section 03300.

1.02 SUBMITTALS

- A. Product Data: Catalog sheets, specifications and installation instructions.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Rigid Ferrous Metal Conduit: Steel, galvanized on the outside and inside (conduit enameled on the inside will not be accepted), UL categorized as Rigid Ferrous Metal Conduit (identified on UL Listing Mark as Rigid Metal Conduit-Steel or Rigid Steel Conduit), as manufactured by Allied Tube & Conduit Corp., LTV Steel Tubular Products Co., Triangle Wire & Cable Inc., or Wheatland Tube Co.
- B. Rigid Nonmetallic Conduit And Fittings (Concrete Encased): Cantex, Inc.'s Schedule 40, Carlon Electrical Products Inc.'s Plus 40, CertainTeed Corp.'s Schedule 40, Omni/Opti-Com Manufacturing Network, Inc.'s Schedule 40 or Queen City Plastic Inc.'s Schedule 40.
- C. Plastic Coated Rigid Metal Conduit, Fittings and Accessories: Rigid ferrous metal conduit, fittings and accessories coated with 40 mils thick polyvinylchloride coating; Occidental Coating Co.'s Ocal 40, Protective Coatings Developments Inc.'s Kor-Kap, or Robroy Industries' Plastibond System.
- D. Conduit Spacers and Levelers: Commercially manufactured type to suit conduit, installation and spacing requirements.
- E. Duct Seal: Appleton Electric Co.'s DUC Weatherproof Compound, Manville Corp.'s Duxseal, OZ/Gedney Co.'s DUX, or Thomas & Betts Corp.'s DX.
- F. Drag Line: Minimum 1/8 inch polypropylene monofilament utility rope; American Synthetic Ropes' Flotorope, Greenlee Tool Co.'s 2 ply Rope 431, or Thomas Industries/Jet Line Products' Rope 232.
- G. Thru Wall Sealing Bushings:
 - 1. For Walls Which Have or Will Have Membrane Waterproofing:
 - a. Cast-In-Place Installations: OZ/Gedney Co.'s Type FSK thruwall seal and Type FSKA membrane clamp adapter.
 - b. Core Drilled or Sleeved Installations: OZ/Gedney Co.'s Type CSM and Type

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- CSMC with membrane clamp adapter.
- 2. For Walls Which Will Not Have Membrane Waterproofing:
 - a. Cast-In-Place Installations: OZ/Gedney Co.'s Type FSK.
 - b. Core Drilled or Sleeved Installations: OZ/Gedney Co.'s Type CSM, or Thunderline Corp.'s Link-Seal.
- H. End Bells:
 - 1. For Rigid Ferrous Metal Conduit: OZ/Gedney Co.'s Type TNS.
 - 2. For Rigid Nonmetallic Conduit: Conduit manufacturer's standard end bells.
- I. Insulated Grounding Bushings: Appleton Electric Co.'s GIB-50 Series, Crouse Hinds GLL Series, OZ/Gedney Co.'s IBC-50L Series, Racor Inc.'s 1212 Series, or Thomas & Betts Corp.'s 3870 or BG Series.

PART 3 EXECUTION

3.01 PREPARATION

- A. Before installing any Work, lay out the proposed course for the conduits, location of manholes, etc. and have same approved by the Owner's Representative.

3.02 INSTALLATION

- A. Spacing:
 - 1. Arrangement for Power and Signal Service: Separate power system conduits from signal system conduits with minimum 6 inches thick concrete wall or 12 inches of earth.
 - 2. Conduit Bank: Separate individual conduits a minimum of 3 inches. Use spacers and levelers located no more than 8 feet apart.
- B. Depth:
 - 1. Existing Grade To Remain: Unless otherwise indicated or directed, install conduit more than 18 inches below existing finished grade.
 - 2. Existing Grade To Be Altered: Unless otherwise indicated or directed, install conduit more than 18 inches below the existing grade where the finished grade is to be higher than the existing grade. Where the finished grade is to be lower than the existing grade, install conduit more than 18 inches below finished grade.
 - 3. Under Roads and Parking Lots:
 - a. Rigid Ferrous Metal Conduit: Unless otherwise indicated or directed, install rigid ferrous metal conduit more than 24 inches below top surface of roads and parking lots.
 - b. Rigid Nonmetallic Conduit (Concrete Encased): Unless otherwise indicated or directed, install concrete encased rigid nonmetallic conduit more than 30 inches below top surface of roads and parking lots.
 - 4. Crossing Obstructions: Use rigid ferrous metal conduit where top of conduit system is less than 18 inches below finished grade when crossing obstructions (heating

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tunnels, etc.).

5. In Rock:

- a. Unless otherwise indicated on the drawings install rigid ferrous metal conduit or concrete encased rigid nonmetallic conduit at depths previously specified. Backfill with suitable material in accordance with SECTION 02200 - EARTHWORK.
- b. Where conduit is indicated to be installed at lesser depths, use rigid ferrous metal conduit. Cover conduit with minimum 2 inches of concrete. In exposed rock area fill trench with concrete to surface level of rock. Where rock is not exposed, complete backfill in accordance with SECTION 02200 - EARTHWORK.

C. Pitch:

1. Pitch conduit away from buildings.
2. Pitch conduit toward manhole a minimum of 12 inches per 100 feet. On runs where it is impossible to maintain the grade all one way, grade from center so that conduits pitch both directions down toward manholes.

D. Concrete Encasement for Rigid Non-Metallic Conduit Using Either of the Two Methods Indicated Below: (Concrete Encasement for Rigid Ferrous Metal Conduit is not Required):

1. Single Pour Method.
2. Two Pour Method:
 - a. Lay rigid nonmetallic conduits on a continuous concrete footing not less than 3 inches thick and as wide as the encasement. Install footings straight and true both in line of run and transversely, and finished with an even surface. Incorporate anchoring devices into the footing for use in tying down the conduits. Grade footings so that conduits maintain required pitch. Before installing spacers, levelers, and conduits, let concrete footings harden as required to prevent damage to the footings.
 - 1) Where conduits enter building or manhole wall, reinforce footings for 10 feet with No. 4 rods, 4 inches on center.
 - 2) Footings are not required for rigid ferrous metal conduit.
 - b. After rigid nonmetallic conduits have been laid on footing with spacers and levelers (located no more than 8 feet apart), tie conduits down to the footing, then surround the conduits by concrete not less than 2 inches thick on top and 2 inches on each side. Separate individual conduits a minimum of 3 inches so that each conduit is completely enveloped in concrete.
 - 1) Where conduits enter building or manhole walls, reinforce encasement for 10 feet with No. 4 rods, 4 inches on center.
 - 2) Encasement is not required for rigid ferrous metal conduit.
 - c. Form sides of the concrete encasement. Exception: Earth cuts will be permitted as the form where trenches are neatly excavated in stable soils.

E. Jacking Conduits: Rigid ferrous metal conduit may be jacked under roads, parking lots, etc. Submit jacking details for approval.

F. Conduits in Filled Ground: Where indicated reinforce the footing and encasement for rigid

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nonmetallic conduits 10 feet beyond limits of fill. Reinforcement, footing or encasement is not required for rigid ferrous metal conduit.

- G. Conduits Entering Buildings and Manholes:
 - 1. Seal conduit entrances into manholes watertight.
 - 2. Seal conduit entrances into building walls watertight. Exception: Seal is not required in below grade foundation walls associated with slab on grade construction.
 - 3. Install end bells at conduit entrances into manholes.
 - 4. Install end bells at conduit entrances into buildings. Exceptions:
 - a. Install insulated grounding bushing on conduit entrance stub up associated with slab on grade construction.
 - b. Install insulated grounding bushing and 2 locknuts on conduit where conduit is terminated in cabinet, junction or pull box.
- H. Cleaning Conduits: Take precautions to prevent foreign matter from entering conduits during installation. After installation clean conduits with tools designed for the purpose.
- I. Conduit for Future Use (Spare Conduit and Empty Conduit): Demonstrate to the Owner's Representative that conduits installed for future use are clear of obstructions (draw mandrel 1/2 inch less in diameter than conduit). Install a drag line in each conduit.
- J. Sealing Ends of Conduits:
 - 1. Occupied Conduits: Seal ends of conduits to be used for Work of this contract until cables are to be installed. After cable installation, seal conduits at building entrances and first manhole outside building. Seal with duct seal.
 - 2. Conduits For Future Use: Seal the ends of spare and empty conduits at building entrances and manholes. Seal with plastic plugs or a contrasting color cement/sand mixture.
- K. Using Existing Underground Conduits: Clean the conduits with tools designed for the purpose. The condition of conduits after cleaning may be determined with a mandrel 1/2 inch less in diameter than the conduit, with the sheath painted with black lacquer. Pull mandrel through conduit. Conduit is acceptable when there are no roller marks or scratches on the mandrel. Other methods may be used if approved. Report and demonstrate to the Owner's Representative any defect found in the conduit system that cannot be eliminated. The Contractor is held responsible for any damage to cables resulting from imperfections in the conduit.

3.03 CONDUIT SCHEDULE - TYPES AND USE

- A. Rigid Ferrous Metal Conduit: Install in all locations unless otherwise specified or indicated on the drawings.
- B. Rigid Nonmetallic Conduit (Concrete Encased): May be installed in all locations except:
 - 1. Where conduit stubs up or rises through slab or finished grade.
 - 2. Where other type raceways are specified or indicated on the drawings.

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- C. Plastic Coated Rigid Metal Conduit: Use at locations indicated on drawings.

END OF SECTION

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WIRING DEVICES

PART 1 GENERAL

1.01 SUBMITTALS

- A. Product Data: Catalog sheets, specifications and installation instructions.

PART 2 PRODUCTS

2.01 SWITCHES

A. Local Switches, Single Pole:

1. 15A, 120/277 V ac; Bryant's 4801, Crouse-Hinds/AH's 1891, General Electric's GE5931-1G, Hubbell's 1201/1101, Leviton's 1201/1101, Pass & Seymour's 15AC1, or Woodhead's 1891.
2. 20A, 120/277 V ac; Bryant's 4901, Crouse-Hinds/AH's 1991, General Electric's GE 5951-1G, Hubbell's 1121/1221, Leviton's 1121/1221, Pass & Seymour's 20AC1, or Woodhead's 1991.
3. 30A, 120/277 V ac; Bryant's 3001, Crouse-Hinds/AH's 3991, General Electric's GE 5991-1G, Hubbell's 3031, Leviton's 3031, or Pass & Seymour's 30AC1.

B. Local Switches, Double Pole:

1. 15A, 120/277 V ac; Bryant's 4802, Crouse-Hinds/AH's 1892, General Electric's GE5932-1G; Hubbell's 1202/1102, Leviton's 1202/1102, Pass & Seymour's 15AC2, or Woodhead's 1892.
2. 20A, 120/277 V ac; Bryant's 4902, Crouse-Hinds/AH's 1992, General Electric's GE5952-1G, Hubbell's 1222/1122, Leviton's 1222/1122, Pass & Seymour's 20AC2, or Woodhead's 1992.
3. 30A, 120/277 V ac; Bryant's 3002, Crouse-Hinds/AH's 3992, General Electric's GE5992-1G, Leviton's 3032, or Pass & Seymour's 30AC2.

C. Local Switches, Three-Way:

1. 15A, 120/277 V ac; Bryant's 4803, Crouse-Hinds/AH 1893, General Electric's GE5933-1, Hubbell's 1203/1103, Leviton's 1203/1103, Pass & Seymour's 15AC3, or Woodhead's 1893.
2. 20A, 120/277 V ac; Bryant's 4903, Crouse-Hinds/AH's 1993, General Electric's GE5953-1G, Hubbell's 1223/1123, Leviton's 1223-2/1123-2, Pass & Seymour's 20AC3, or Woodhead's 1993.
3. 30A, 120/277 V ac; Bryant's 3003, Crouse-Hinds/AH's 3993, General Electric's GE5993-1G, Leviton's 3033, or Pass & Seymour's 30AC3.

D. Local Switches, Four-Way:

1. 15A, 120/277 V ac; Bryant's 4804, Crouse-Hinds/AH's 1894, General Electric's GE5934-1G, Hubbell's 1204/1104, Leviton's 1204-2/1104-2, Pass & Seymour's 15AC4, or Woodhead's 1894.
2. 20A, 120/277 V ac; Bryant's 4904, Crouse-Hinds/AH's 1994, General Electric's GE5954-1G, Hubbell's 1224/1124, Leviton's 1224-2/1124-2, Pass & Seymour's

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20AC4, or Woodhead's 1994.

3. 30A, 120/277 V ac; Crouse-Hinds/AH's 3994, or General Electric's GE5994-1G.

E. Local Switches, Key-Operated:

1. Similar to toggle type local switches except operated by removable key instead of lever. Furnish 2 keys with each switch.

F. Motor Switch:

1. Toggle type, fractional hp Manual Starter with Melting Alloy Type Thermal Overload Relay, 115/230 V, 16A, Square D Class 2510 or approved equivalent.

2.02 RECEPTACLES

A. Specification Grade Receptacles:

1. Single receptacle, NEMA 5-15R (15A, 125 V, 2P, 3W); Bryant's 5251, Crouse-Hinds/AH's 5251, General Electric's 5251-1, Hubbell's 5251, Leviton's 5251, or Pass & Seymour's 5251.
2. Duplex receptacle, NEMA 5-15R (15A, 125 V, 2P, 3W); Bryant's 5252/5242, Crouse-Hinds/AH's 5252/5242, General Electric's GEN5252-1, Hubbell's 5252/5242, Leviton's 5252/5242, Pass & Seymour's 5252/5242.
3. Single receptacle, NEMA 5-20R (20A, 125 V, 2P, 3W); Bryant's 5361/5351, Crouse-Hinds/AH's 5361/5351, General Electric's GE4103-1, Hubbell's 5361/5351, Leviton's 5361/5351, or Pass & Seymour's 5351.
4. Duplex receptacle, NEMA 5-20R (20A, 125 V, 2P, 3W); Bryant's 5362, Crouse-Hinds/AH's 5352/5342, General Electric's GE5352-1, Hubbell's 5352, Leviton's 5352, or Pass & Seymour's 5352.

B. Ground Fault Interrupter Receptacles:

1. Duplex receptacle rated 15A (NEMA 5-15R), circuit-ampacity 20A; Bryant's GFR52FT, Crouse-Hinds/AH's GF5242, General Electric's GF5242, Hubbell's GF5252, Leviton's 6599, Pass & Seymour's 1591S, or Daniel Woodheads 5252GF.
2. Duplex receptacle rated 20A (NEMA 5-20R), circuit ampacity 20A; Bryant's GFR53FT, Crouse-Hind/AH's GF5342, General Electric's GF5342, Hubbell's GF 5352, Leviton's 6899, Pass & Seymour's 2091S, or Daniel Woodheads 5352GF.

C. Isolated Ground Receptacles:

1. Single receptacle, NEMA 5-15R (15A, 125 V, 2P, 3W); Hubbell's IG5261, Leviton's 5261-IG, Cooper Wiring Devices IG5261.
2. Duplex receptacle, NEMA 5-15R (15A, 125 V, 2P, 3W); Hubbell's IG-5262, Leviton's 5262-IG, Cooper Wiring Devices IG5262.
3. Single receptacle, NEMA 5-20R (20A, 125 V, 2P, 3W); Hubbell's IG5361, Cooper Wiring Devices IG5361.
4. Duplex receptacle, NEMA 5-20R (20A, 125 V, 2P, 3W); Hubbell's IG5362, Leviton's 5362-IG, Cooper Wiring Devices IG5362.

D. Corrosion Resistant Receptacles:

1. Duplex receptacle, NEMA 5-15R (15A, 125 V, 2P, 3W): Bryant's 5262-CR,

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Crouse-Hinds/AH's 5262CR, General Electric's GE5262-C, Hubbell's 5262-ILH or Pass & Seymour's CR6200.

- E. Special Purpose Receptacles: Furnish matching nylon, polycarbonate or armored plug with each receptacle as specified as follows or on the drawing.
 - 1. Dryer Outlet: NEMA 10-30R (3P, 3W, 30A, 125/250 V); Bryant's 9303, Crouse-Hinds/AH's 9344N, General Electric's GE4132-3, Hubbell's 9350, Leviton's 5207, or Pass & Seymour's 3860.
 - 2. Range Outlet: NEMA 10-50R (3P, 3W, 50A, 125/250 V); Bryant's 9306, Crouse-Hinds/AH's 7985N, General Electric's GE4152-3, Hubbell's 7962, Leviton's 5206GR, or Pass & Seymour's 3890.
 - 3. Other Types: As produced by Bryant, Crouse-Hinds/AH, General Electric, Hubbell, or Pass & Seymour. NEMA configuration and ratings to suit requirements.

2.03 WALL PLATES

- A. Stainless Steel Wall Plates: Type 302 stainless steel with satin finish; Hubbell's 97000 Series, Leviton's 84000 Series, or Cooper Wiring Devices 93000 Series.
- B. Covers for Threaded Type Boxes: Stamped sheet steel, gasketed device covers as produced by Crouse-Hinds Co., or OZ/Gedney Co.

2.04 EMERGENCY SHUTDOWN SWITCHES

- A. Emergency Shutdown Pushbutton Switch: Square D. Co.'s Class 9001, Type K, pushbutton operator with the following:
 - 1. Red mushroom button.
 - 2. Transformer type red pilot light.
 - 3. Legend red plate with words "Emerg. Stop".
 - 4. NEMA 13 oil tight enclosure with cover riveted to body.

2.05 NAMEPLATES

- A. Phenolic Type: Standard white phenolic nameplates with 3/16 inch minimum size black lettering engraved thereon.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install wiring devices in outlet boxes.
- B. Local Switches:
 - 1. Install local switches rated 15A, 120/277 V ac for switches unless otherwise shown on the drawings or specified.
 - 2. Install switches indicated Sa, Sb, Sc, etc, for control of outlets or fixtures with

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- corresponding letters on the same circuit.
3. Where more than one switch occurs at same location in a 120 volt system, arrange switches in gangs and cover with one face plate.
 4. Install switches in a 277 volt system in separate single boxes if voltage between exposed live metal parts of adjacent switches exceeds 300 volts.
 5. Install single and double pole switches so that switch handle is up when switch is in the "On" position.
- C. Receptacles:
1. Install Specification Grade receptacles, NEMA 5-15R, 15A, 125 V, 2P, 3W, for duplex receptacles and single receptacles unless otherwise shown on the drawings or specified.
 2. Install receptacles with ground pole in the down position.
- D. Wall Plates:
1. Install wall plates on all wiring devices in dry locations, with finish to match hardware in each area.
 2. Install blank wall plates on outlet boxes which are for future equipment except telephone outlets.
 3. Install 5/8 inch bushed wall plates on telephone outlets.
- E. Weatherproof Covers: Install weatherproof covers on wiring devices in damp and wet locations.
- F. Nameplates: Provide phenolic or embossed aluminum nameplate for each special purpose receptacle indicating phase, ampere and voltage rating of the circuit. Attach nameplate with rivets or tamperproof fasteners to wall plate or to wall above receptacle. Wall plates may be engraved with required data in lieu of separate nameplates.
- G. Mats: Where flush plates are required over outlet boxes that cannot be set deep enough for the plates to fit closely over the finished wall surfaces, provide oak mats to fill the space between the finished wall surface and the plate.

END OF SECTION

SECTION 16221
MOTOR CONTROLLERS

PART 1 GENERAL

1.01 PRODUCTS FURNISHED BUT NOT INSTALLED

- A. Deliver the following items to the Electric Contractor for installation and connection to power wiring:
 - 1. Motor controllers.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Wiring, General – 600 Volts and Under: Section 16121.

1.03 REFERENCES

- A. NEMA MG-1 - Motors and Generators.
- B. NEMA ICS - General Standards for Industrial Control and Systems.
- C. UL508 - Electric Industrial Control Equipment.
- D. IEEE 519 - Recommended Practices and Requirements for Harmonic Control in Electric Power Systems.

1.04 SUBMITTALS

- A. Submittal Package: Submit the product data, and quality control submittals specified below at the same time as a package.
- B. Product Data:
 - 1. Motor Controllers: Catalog sheets, specifications, and installation instructions. Submit product data for motor controllers simultaneously with product data required for motors.
 - a. Identify each controller for use with corresponding motor.
 - b. Describe overload devices being supplied with each motor controller (include equipment manufacturer's recommendations).
 - c. Enumerate and describe all accessories being supplied with each motor controller.
 - 2. All Motors:
 - a. Catalog sheets, specifications and installation instructions.
 - b. Data proving that voltage rating of each motor is in accordance with specified NEMA standard motor voltage.
 - c. Data proving that the service factor and temperature rise for the motor's insulation system conforms to NEMA standards for each motor's specific application.
 - d. Data proving that the motor efficiency rating conforms to NEMA testing and marking standards MG1-12.54 and 12.55.
 - 3. Additional Data for Motors Controlled by Solid State or Adjustable Speed Motor Controllers:

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MOTOR CONTROLLERS

- a. Data proving that the motor has been designed for use with associated controller.
- 4. Additional Data for Motors 50 HP and Larger: Certified report of manufacturer's routine tests for each motor (NEMA MG 1-12.54).
- C. Quality Control Submittals:
 - 1. Harmonic analysis report.
 - 2. Company Field Advisor Data: Include:
 - a. Name, business address and telephone number of Company Field Advisor secured for the required services.
 - b. Certified statement from the Company listing the qualifications of the Company Field Advisor.
 - c. Services and each product for which authorization is given by the Company listed specifically for this project.
- D. Contract Closeout Submittals:
 - 1. System acceptance test report.
 - 2. Certificate: Affidavit, signed by the Company Field Advisor, certifying that the system meets the contract requirements and is operating properly.
 - 3. Operation and Maintenance Data: Deliver 2 copies, covering the installed products, to the Owner's Representative.

1.05 QUALITY ASSURANCE

- A. Equipment Qualifications For Products Other Than Those Specified:
 - 1. At the time of submission provide written notice to the Owner/Owner's Representative of the intent to propose an "or equal" for products other than those specified. Make the "or equal" submission in a timely manner to allow the Owner's Representative sufficient time to review the proposed product, perform inspections and witness test demonstrations.
 - 2. If products other than those specified are proposed for use furnish the name, address, and telephone numbers of at least 5 comparable installations that can prove the proposed products have performed satisfactorily for 3 years. Certify in writing that the owners of the 5 comparable installations will allow inspection of their installation by the Owner's Representative and the Company Field Advisor.
 - a. Make arrangements with the owners of 2 installations (selected by the Owner's Representative) for inspection of the installations by the Owner's Representative. Also obtain the services of the Company Field Advisor for the proposed products to be present. Notify the Owner's Representative a minimum of 3 weeks prior to the availability of the installations for the inspection, and provide at least one alternative date for each inspection.
 - b. Only references from the actual owner or owner's representative (Security Supervisor, Maintenance Supervisor, etc.) will be accepted. References from dealers, system installers or others, who are not the actual owners of the proposed products, are not acceptable.
 - 1) Verify the accuracy of all references submitted prior to submission and certify in writing that the accuracy of the information has been confirmed.

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MOTOR CONTROLLERS

3. The product manufacturer shall have test facilities available that can demonstrate that the proposed products meet the contract requirements.
 - a. Make arrangements with the test facility for the Owner's Representative to witness test demonstrations. Also obtain the services of the Company Field Advisor for the proposed product to be present at the test facility. Notify the Owner's Representative a minimum of 3 weeks prior to the availability of the test facility, and provide at least one alternative date for the testing.
 4. Provide written certification from the manufacturer that the proposed products are compatible for use with all other equipment proposed for use for this system and meet all contract requirements.
- B. Harmonic Analysis:
1. The adjustable speed motor controller manufacturer shall perform a harmonic current magnitude and voltage distortion analysis and provide certified calculations specific to this installation, showing that the total harmonic distortion caused by the adjustable speed motor controller will be below the specified level. The analysis shall be accordance with IEEE 519.
 2. The results shall be based on a computer aided/model circuit from the controller to the distribution transformer supplying the controller, based upon the materials and equipment proposed to be furnished and installed, and associated portions of the existing electrical system. The secondary winding connection of the distribution transformer shall be considered the point of common coupling as described in IEEE 519.
 - a. Basic parameters relative to the existing system are specified herein. Additional information deemed necessary by the controller manufacturer to provide a certified harmonic analysis report shall be obtained by a field investigation of the existing system, at no additional cost to the Owner.
- C. Company Field Advisor: Secure the services of a Company Field Advisor from the Company providing the solid state controllers and the adjustable speed controllers for a minimum of 8 working hours for the following:
1. Render advice regarding installation, programming, final adjustment, and testing.
 2. Witness final system test and then certify with an affidavit that the motor controllers are installed in accordance with the contract documents and are operating properly.
 3. Train facility personnel on the operation and maintenance of the motor controllers (minimum of two 1 hour sessions).
 4. Explain available service programs to facility supervisory personnel for their consideration.
- D. Service Availability: A fully equipped service organization shall be available to service the completed Work.

PART 2 PRODUCTS

2.01 MANUAL AND MAGNETIC MOTOR CONTROLLERS

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MOTOR CONTROLLERS

- A. Minimum Size: The minimum allowable size of single or three phase magnetic motor controller is NEMA size 0.
- B. Voltage Rating: To suit system voltage.
 - 1. For single phase motor controllers which are not produced to suit the system voltage and phases, furnish properly rated 3 phase motor controllers and utilize required number of poles for the single phase circuit.
- C. Enclosures:
 - 1. NEMA Type: Unless otherwise indicated, furnish NEMA 12 enclosures.
 - 2. Material: Steel construction unless otherwise indicated.
- D. Control Power: Furnish fused secondary control power transformer (maximum control voltage 120 volts) mounted within each magnetic motor controller enclosure.
- E. Local Control Devices:
 - 1. Manual Motor Controllers:
 - a. Type A1 Controller: In addition to the on/off switch function, furnish where indicated, a hand/auto switch or 3 position hand-off-auto switch mounted in the enclosure cover.
 - 2. Magnetic Motor Controllers: Equip controllers with push buttons, or 3 position hand-off-auto selector switch, (to suit operation) mounted in the enclosure cover.
 - a. For NEMA 1 enclosures furnish standard duty devices.
 - b. For other NEMA enclosures furnish heavy duty devices to suit the requirements of the NEMA enclosure.
- F. Pilot Lights:
 - 1. Manual Motor Controllers: Equip controllers with pilot lights (neon) mounted in the enclosure cover.
 - 2. Magnetic Motor Controllers: Equip controllers with pilot lights of the neon lamp type or transformer type, mounted in the enclosure cover.
- G. Space Heaters: Equip magnetic motor controllers which are installed outdoors, and indoors in unheated locations, with space heaters and humidistat to prevent condensation within the housing.
- H. Overload Devices: Equip motor controllers with manual reset melting type (eutectic), or manual reset bi-metallic type standard trip overload devices (NEMA Class 20, trips in 20 seconds or less when carrying a current equal to 600 percent of its current rating).
 - 1. Equip motor controllers with automatic reset overload devices only where indicated.
 - 2. Equip motor controllers with fast trip overload devices when recommended by equipment manufacturer (NEMA Class 10, trips in 10 seconds or less when carrying a current equal to 600 percent of its current rating).
 - 3. Equip motor controllers with slow trip overload devices when recommended by equipment manufacturer (NEMA Class 30, trips in 30 seconds or less when carrying a current equal to 600 percent of its current rating).

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4. Equip motor controllers with ambient compensated overload protection where motor and relay are not in the same ambient.
 5. Equip motor controllers with solid state overload relays where indicated.
- K. Manual Motor Controller Types:
1. Type A (Full Voltage, Non-Magnetic): Allen-Bradley Co.'s Bulletin 609, Cutler-Hammer Products' File A/B300-9115, Furnas Electric Co.'s Class 11, General Electric Co.'s CR-1062, or Square D Co.'s Class 2510, Type M.
 2. Type A1 (Full Voltage, Non-Magnetic Single Phase): Allen-Bradley Co.'s Bulletin 600, Cutler-Hammer Products' File B200-9101, Furnas Electric Co.'s class 10, General Electric Co.'s CR-101, or Square D Co.'s Class 2510, Type F.
 3. Type A2 (2 Speed, 2 Winding, Full Voltage, Non-Magnetic): Allen-Bradley Co.'s Bulletin 609TS, Cutler-Hammer Products' File A700, General Electric Co.'s CR-1062, or Square D Co.'s Class 2512, Type M.
 4. Type A3 (2 Speed, 2 Winding, Full Voltage, Non-Magnetic, Single Phase): Allen-Bradley Co.'s Bulletin 600, Cutler-Hammer Products' File B200-9106, General Electric Co.'s CR-101, or Square D Co.'s Class 2512, Type F.
- L. Magnetic Motor Controller Types:
1. Type B (Full Voltage Magnetic): Allen-Bradley Co.'s Bulletin 509, Cutler-Hammer Products' File A10-9586, Furnas Electric Co.'s Class 14, General Electric Co.'s CR-306, or Square D Co.'s Class 8536.
 2. Type B-COM (Combination Full Voltage, Magnetic/Safety Switch): Allen-Bradley Co.'s Bulletin 512, Cutler-Hammer Products' File A30-9589, Furnas Electric Co.'s Class 17, General Electric Co.'s, CR-308, or Square D Co.'s Class 8538.
 3. Type B2 (2 Speed, 2 Winding, Full Voltage, Magnetic): Allen-Bradley Co.'s Bulletin 530, Cutler-Hammer Products' File A700, Furnas Electric Co.'s Class 30, General Electric Co.'s CR-309, or Square D Co.'s Class 8810.
- M. Remote Control Stations:
1. Heavy Duty: Start-Stop with pilot light unless otherwise indicated, in NEMA enclosure to suit conditions; Allen-Bradley Co.'s Bulletin 800T, Cutler-Hammer Products' 10250T, Furnas Electric Co.'s Class 52, General Electric Co.'s CR104P, or Square D Co.'s Class 9001.

2.03 SOLID STATE MOTOR CONTROLLERS

- A. Type SS: Microprocessor controlled, solid state, stepless, reduced voltage motor controller:
1. Companies and Models: Furnish the Company's model which meets the requirements of the motor and driven equipment combination, suits the electrical system parameters, and accommodates the operating features and accessories:
 - a. Rockwell Automation's SMC Flex Smart Motor Controller (5-1250A, 200-600V)
 - b. Safetronics IMS2 solid state starters (18-1574A, 200-690V).
 - c. Benshaw Model RSM7 (1 – 1200hp, 200-600V)
 2. Operating Features And Accessories:
 - a. Single speed.

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MOTOR CONTROLLERS

- b. Constant current starting mode: Motor receives constant current within the current level limit adjustments. Once up to speed the current falls back to the motor running current.
- c. Voltage limiter set to not exceed voltage rating of motor.
- d. Ambient operating temperature range 0 to 40 degrees C. Maximum humidity 95 percent.
- e. Digital display, or meters with switches, showing operational functions:
 - 1) Voltage.
 - 2) Current.
 - 3) Elapsed time.
- f. Digital display, or LED's showing diagnostic functions, including:
 - 1) Phase loss.
 - 2) Phase reversal.
 - 3) Undervoltage.
 - 4) Overtemperature.
- g. Trouble alarm contact for remote alarm to Owner's SCADA system.
- h. Suitable for use on circuit capable of delivering 65,000amps RMS short circuit fault current.
- i. Input voltage: Suitable for use on 480VAC, 3 phase circuit.
- j. 100 percent continuous current rating, 300 percent for 30 seconds.
- k. Local control panel for manual operation:
 - 1) Hand-Automatic selector switch, and start-stop pushbuttons.
 - 2) Run light.
- l. Local programming panel or other control method for:
 - 1) Acceleration rate.
 - 2) Deceleration rate.
- m. Fused secondary control power transformer.
- n. Start/stop control voltage maximum 120 V, 3 wire.
- o. Auxiliary output contacts, 120 VAC, 10A:
 - 1) Fault: 1 N.O., 1 N.C.
- p. Overload Devices: Equip motor controller with manual reset solid state, manual reset melting type (eutectic), or manual reset bi-metallic type standard trip overload devices (NEMA Class 20, trips in 20 seconds or less when carrying a current equal to 600 percent of its current rating).
- q. NEMA 12 enclosure.
- r. Input circuit breaker/disconnect switch with external operator.
- s. Transient protective devices on input terminals; Innovative Technology Inc.'s P-Plus Protector or approved equivalent.
- t. Output isolation contactor to open circuit to motor whenever controller is in stop mode.
- v. Provide additional operating features and accessories as required by the manufacturer of the equipment which the motor controller is driving.

2.04 ADJUSTABLE SPEED MOTOR CONTROLLERS

- A. Type AS-PWM for Motor: Microprocessor based, sine-coded pulse-width-modulation design variable frequency/variable voltage adjustable speed motor controller:

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1. Companies and Models: Furnish the Company's model which meets the requirements of the motor and driven equipment combination, suits the electrical system parameters, and accommodates the operating features and accessories:
 - a. Allen-Bradley Co. Inc. Power Flex
 - b. ABB ACS550
 - c. Square D Co.'s Altivar 61
2. Operating Features And Accessories:
 - a. Suitable for variable torque load.
 - b. Soft start: Adjustable time range of 2 to 600 seconds.
 - c. Ground fault protection.
 - d. Ambient operating temperature range 0 to 50 degrees C. Maximum humidity 95 percent.
 - e. Digital display showing operational functions:
 - 1) Speed.
 - 2) Output voltage.
 - 3) Output current.
 - 4) Elapsed time.
 - f. Digital display, or LED's showing diagnostic functions, including:
 - 1) Overcurrent.
 - 2) Overvoltage.
 - 3) Undervoltage.
 - 4) Overtemperature.
 - 5) Ground fault.
 - 6) Overload.
 - g. Fault alarm contact for remote alarm to Owner's SCADA system.
 - h. Suitable for use on circuit capable of delivering 65,000 amps RMS short circuit fault current.
 - i. Input voltage: Suitable for use on 480VAC 3 phase circuit.
 - j. Output voltage 0 to 480 VAC, 3 phase.
 - k. Frequency:
 - 1) Input: 60 Hz.
 - 2) Selectable Output: 3 to 60 Hz, with separately adjustable min/max frequency limits and capability to lock these limits so that they cannot be exceeded.
 - 3) Frequency Reject: Programmable (both the width and the midpoint of up to 3 bands, or end points) to reject operation within the selected bands.
 - 4) Output regulation: + .06 percent.
 - l. 100 percent continuous current rating, 110 percent for one minute every 10 minutes.
 - m. Local control panel for manual operation:
 - 1) Hand-Automatic selector switch, and start-stop pushbuttons.
 - n. Local programming panel for:
 - 1) Acceleration rate.
 - 2) Deceleration rate.
 - 3) Start torque (boost).
 - 4) Maximum frequency.
 - 5) Volts/Hz pattern.

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- 6) Restart Mode: Manual reset/restart upon return of input power or overload.
- 8) Start local or remote.
- 9) Stop mode, ramp or coast.
- o. Interface Input For Automatic Speed Control: Interface which accepts signals from programmable logic control, or computer, for automatic speed control when the controller is in the automatic mode of operation.
- p. Start/stop control voltage maximum 120 V.
- q. Programmable auxiliary output contacts, 120 VAC, 10A:
 - 1) Spares, for future use: 1 N.O., 1 N.C.
- r. Electronic overload device that monitors the motor function to provide motor overload protection at all speeds. Manual or automatic reset as specified under local programming panel.
- s. Motor winding protection, responsive to the motors' imbedded temperature measuring detectors for all VFD's supplying motors larger than 100hp.
- t. NEMA 12 enclosure with closed loop heat exchanger.
- u. Input circuit breaker/disconnect switch with external operator.
- v. Controller design shall include DC bus choke to reduce harmonic current induced on AC system supplying the drive due to drive operation.
- w. Line Reactor with minimum 3% impedance.
- x. Remote operator station, NEMA 4X enclosure:
 - 1) Estop
- aa. Provide contactor output to motor heater relay that shall activate whenever pump is running.
- bb. Provide additional operating features and accessories as required by the manufacturer of the equipment which the adjustable speed motor controller is driving.

2.05 NAMEPLATES

- A. General: Precision engrave letters and numbers with uniform margins, character size minimum 3/16 inch high.
 - 1. Phenolic: Two color laminated engraver's stock, 1/16 inch minimum thickness, machine engraved to expose inner core color (black lettering on white background).

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install the Work of this Section in accordance with the manufacturer's printed instructions.
- B. Nameplates: Identify each remote control station, indicating motor controlled. Identify each interlock switch, indicating purpose of switch:
 - 1. NEMA 1 Enclosures: Rivet or bolt nameplate to the cover.
 - 2. NEMA 12 Enclosures: Rivet or bolt and gasket nameplate to the cover.

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3. NEMA 3R, 4, 4X, 7, or 9 Enclosures: Attach nameplates to the cover using adhesive specifically designed for the purpose, or mount nameplate on wall or other conspicuous location adjacent to switch. Do not penetrate enclosure with fasteners.

3.02 REMOTE CONTROL STATION SCHEDULE

- A. Use heavy duty remote control stations in all locations.
- B. Control stations in hazardous areas shall be appropriately rated.

3.03 FIELD QUALITY CONTROL

- A. Preliminary System Test:
 1. Preparation: Have the Company Field Advisor program and adjust the completed solid state and adjustable speed motor controllers and then operate them long enough to assure that they are performing properly.
 2. Run a preliminary test for the purpose of:
 - a. Determining whether motor controllers are in a suitable condition to conduct an acceptance test.
 - b. Checking instruments and equipment.
 - c. Training facility personnel.
- B. System Acceptance Test:
 1. Preparation: Notify the Owner's Representative at least 3 working days prior to the test so arrangements can be made prior to the test to have a Facility Representative witness the test.
 2. Make the following tests:
 - a. Demonstrate that each solid state and adjustable speed motor controller performs its intended function.
 - b. Use a preapproved harmonics meter to determine the total harmonic distortion caused by the adjustable speed motor controllers.
 - 1) While the motors are running, measure the total harmonic distortion at the distribution transformer supplying the controllers.
 - 2) If total harmonic distortion caused by the adjustable speed motor controllers exceeds specified limit, install additional equipment as necessary to keep the total harmonic distortion caused by the adjustable speed motor controllers under the IEEE 519 limit.
 3. Supply all equipment necessary for system adjustment and testing.
 4. Submit written report of test results signed by the Company Field Advisor and the Owner's Representative.

3.04 MOTOR CONTROLLER SCHEDULE

- A. Types of Motor Controllers Required For Single Speed Motors, Unless Indicated Otherwise On Drawings:
 1. Nominal 120/208 V, Single Phase, 3W, Premises Wiring System:

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- a. Single Phase Motors 5 hp or Less - Manually Operated: Type A.
Exception: Type A1 may be used for motors 1 hp or less.
 - b. Single Phase Motors 5 hp or Less - Automatically Operated: Type B.
Exception: Type A or Type A1 may be used for motors less than 1/2 hp when the automatic auxiliary controlling device (thermostat, pressure switch, etc.) is rated for the voltage and current requirements of the motor.
 - 2. 120/208 V, Three Phase, 4W, Premises Wiring System:
 - a. Single Phase Motor Less Than 1 hp - Manually Operated: Type A or Type A1.
 - b. Single Phase Motors Less Than 1 hp - Automatically Operated: Type B.
Exception: Type A or Type A1 may be used for motors less than 1/2 hp when the automatic auxiliary controlling device (thermostat, pressure switch, etc.) is rated for the voltage and current requirements of the motor.
 - c. Three Phase Squirrel Cage Motors Less Than 1 hp - Manually or Automatically Operated: Type B-COM.
 - 3. 277/480 V, Three Phase, 4W, Premises Wiring System:
 - a. Single Phase Motors Less than 1/2 hp - Manually Operated: Type A or Type A1.
 - b. Single Phase Motors Less Than 1/2 hp - Automatically Operated: Type B. Exception: Type A or Type A1 may be used when the automatic auxiliary controlling device (thermostat, pressure switch, etc.) is rated for the voltage and current requirements of the motor.
 - c. Three Phase Squirrel Cage Motors Less than 15 hp - Manually or Automatically Operated: Type B-COM (B when indicated on drawings) or Type SS.
 - d. Three Phase Squirrel Cage Motors 15 hp and Larger - Manually or Automatically Operated: Type C-COM or Type SS.
- B. Types of Motor Controllers Required For 2 Speed Motors, Unless Indicated Otherwise on Drawings:
- 1. Nominal 120/240 V, Single Phase, 3W, Premises Wiring System:
 - a. Single Phase Motors 5 hp or Less - Manually Operated: Type A2.
Exception: Type A3 may be used for motors 1 hp or less.
 - b. Single Phase Motors 5 hp or Less - Automatically Operated: Type B2.
 - 2. 120/208 V, Three Phase, 4W, Premises Wiring System:
 - a. Single Phase Motors Less Than 1 hp - Manually Operated: Type A2.
Exception: Type A3 may be used for motors 1/2 hp or less.
 - b. Single Phase Motors Less Than 1 hp - Automatically Operated: Type B2.
 - c. Three Phase Squirrel Cage Motors Less Than 7-1/2 hp - Manually or Automatically Operated: Type B2 or Type SS.
 - d. Three Phase Squirrel Cage Motors 7-1/2 hp and Larger: Type SS.
 - 3. 277/480 V, Three Phase, 4W, Premises Wiring System:
 - a. Single Phase Motors Less Than 1/2 hp - Manually Operated: Type A2 or Type A3.
 - b. Single Phase Motors Less Than 1/2 hp - Automatically Operated: Type B2.

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- c. Three Phase Squirrel Cage Motors Less Than 15 hp - Manually or Automatically Operated: Type B2 or Type SS.
 - d. Three Phase Squirrel Cage Motors 15 hp and Larger: Type B-COM or Motor Control Center.
- C. Types of Motor Controllers Required For Variable Speed Applications:
- 1. Three Phase Premises Wiring System:
 - a. Three Phase Motors 1 to 800 hp: Type AS-PWM.
 - 1) The four 200HP Sewage Pumps
 - a) The VFD for pump #2 and pump #3 shall have bypass and soft starters.

END OF SECTION

SECTION 16231
DIESEL-ALTERNATOR EMERGENCY SYSTEM

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Automatic Transfer Switch: Section 16414.

1.02 SYSTEM DESCRIPTION

- A. Design Criteria: The diesel-alternator units are intended to:
1. Supply power on an emergency basis for short periods of time, less than 1000 hours annually or less than 10,000 hours during the initial 10 years of operation.
 2. Operate 5000 hours without major repairs or overhauls, and be rebuildable at least once.
 3. Operate in coordination with Automatic Transfer Switch.
- B. Description of System:
1. The diesel-alternator emergency system powers emergency feeders in the event of failure of the normal power source.
 2. In normal operating condition, the mechanism of the transfer switch is in the normal position and the diesel-alternator unit shut down. Sequence of transfer operation occurs as follows:
 - a. Upon signal from the Automatic Transfer Switch, the diesel-alternator unit automatically starts.
 - b. Complete transition from onset of normal feeder failure to emergency feeder transfer shall not exceed 10 seconds.
 - c. The diesel-alternator unit continues to run until the automatic transfer switch signals for the unit to shut down.

1.03 SUBMITTALS

- A. Submittals Package: Submit the product data, shop drawings, and quality control submittals specified below at the same time as a package.
- B. Shop Drawings:
1. Manufacturer's drawings showing the construction (outline) of the diesel-alternator unit, sound attenuating enclosure and accessories.
 2. Installation details.
 3. Housing details including layout of equipment, raceways, piping, etc.
- C. Product Data:
1. Catalog sheets, specifications and installation instructions.
 2. Bill of materials.
 3. Detailed sequence of operations (format similar to SYSTEM DESCRIPTION).
 4. Company's data indicating fuel consumption with the unit operating at 1/2, 3/4 and full load.
 5. Name, address and telephone number of nearest fully equipped service organization.

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D. Quality Control Submittals:

1. Design Data:

- a. Company's data indicating hp, kW and kVA ratings with proof that the unit will meet the full load test without exceeding NEMA temperature rise specified.
- b. Certified data from the Company proving that the unit will meet the requirements of 1.02 A. Design Criteria.
- c. Torsional stress compatibility analysis for the proposed diesel/ alternator combination proving that the torsional stress will not exceed the specified limit.
- d. Ampere requirements of the starting system (at the batteries' specified minimum ambient temperature) during cranking.
 - 1) Include engine manufacturer's recommended battery ampere-hour capacity at the minimum ambient temperature condition for the specified duration and number of crank cycles.
 - 2) Include battery manufacturer's data proving that the batteries will meet the ampere-hour requirements at the batteries minimum ambient temperature.
 - 3) Include details of battery charger and battery rack recommended by battery manufacturer.

2. Company Field Advisor Data: Include:

- a. Name, business address and telephone number of Company Field Advisor secured for the required services.
- b. Certified statement from the Company listing the qualifications of the Company Field Advisor.
- c. Services and each product for which authorization is given by the Company, listed specifically for this project.

3. Completed Installation Lists.

E. Contract Closeout Submittals:

1. Operation and Maintenance Data: Deliver 2 copies, covering the installed products, to the Owner's Representative. Include name, address and telephone number of nearest fully equipped service organization.
2. Test Report: System acceptance test report.
3. Certificate: Affidavit, signed by the Company Field Advisor, certifying that the system meets the contract requirements and is operating properly.

1.04 QUALITY ASSURANCE

A. Source Quality Control: The Company producing the diesel-alternator unit shall have test facilities available which can demonstrate that the proposed system meets contract requirements.

1. If brand names other than those specified are proposed for use, pay all costs, including travel expenses to the test facility for the Owner's Representative to witness test demonstration.

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DIESEL-ALTERNATOR EMERGENCY SYSTEM

- B. List of Completed Installations:
1. Diesel-Alternator Unit: If brand names other than those specified are proposed for use, furnish the name, address and telephone number of at least 5 comparable installations which can prove the proposed products have operated satisfactorily for 3 years.
 2. Other Products: If brand names other than those specified are proposed for use, furnish the name, address and telephone number of a least 5 comparable installations which can prove the proposed products have operated satisfactorily for 3 years.
- C. Company Field Advisor: Secure the services of a Company Field Advisor for a minimum of 16 working hours for the following:
1. Render advice regarding installation and final adjustment of the system.
 2. Witness final system test and then certify with an affidavit that the system is installed in accordance with the contract documents and is operating properly.
 3. Train facility personnel on the operation and maintenance of the system (minimum of two 2 hour sessions).
 4. Explain available service programs to facility supervisory personnel for their consideration.
- D. Service Availability: A fully equipped service organization capable of guaranteeing response time within 8 hours to service calls shall be available 24 hours a day, 7 days a week to service the completed Work.

1.05 PROJECT CONDITIONS

- A. The diesel-alternator unit shall meet all requirements at the following elevation and ambient temperatures (actual site conditions):
1. Elevation Above Sea Level: 500 feet.
 2. Maximum Ambient Temperature: 104 degrees F.
 3. Minimum Ambient Temperature: -20 degrees F.

1.06 MAINTENANCE

- A. Spare Parts:
1. Two sets of gaskets for routine engine maintenance.
 2. Two spare heating elements for water jacket heater. Furnish spare water jacket heater if elements are not replaceable.
 3. Set of belts.
 4. Set of oil filter elements.
 5. Set of fuel filter elements.
 6. Set of air cleaner elements.
 7. Hydrometer for testing anti-freeze solution.
 8. Test kit for checking chemical condition of coolant.
 9. One year supply of coolant conditioner.
 10. Special tools if required for the regular maintenance and minor repairs of the unit.

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DIESEL-ALTERNATOR EMERGENCY SYSTEM

PART 2 PRODUCTS

2.01 DIESEL-ALTERNATOR UNIT

- A. Rating:
 - 1. 500 kW, 0.80 pf, 480/277V, 60 Hz.

- B. Acceptable Companies: Caterpillar Tractor Co., Cummins/Onan Corp., Detroit Diesel Allison, or Kohler Co.

- C. Base:
 - 1. All Units - Rigid, electrically welded structural steel base with diesel-alternator mounted directly thereon complete with spring type vibration isolators, provisions for foundation bolts and provisions for lifting entire unit.
 - 2. Base shall include "Belly Tank" sized for 48 hours of generator operation at full load.

- D. Engine:
 - 1. Industrial type diesel engine, water cooled, pressure lubricated, medium speed (1800 rpm maximum), full diesel with mechanical fuel injection. Engine shall be capable of starting cold, solely from the heat of compression, operating on No. 2 diesel fuel.
 - 2. Torsional stress of the engine crankshaft and alternator rotor shaft shall not exceed 5000 pounds per square inch when operating as an assembled unit at rated speed and power output.
 - 3. Maximum average fuel consumption:
 - a) 42 gallons per hour at rated full load.
 - 4. Engine Accessories: Equip engine with the Company's standard accessories. Exception: In addition to, or in lieu of the Company's standard accessories for the following, equip engine with:
 - a. Electric starting system, 24 vdc minimum.
 - b. Fuel filters, full flow (redundant) spin on type.
 - c. Dry type air cleaner (replaceable element).
 - d. Lubricating oil filters, full flow (with by-pass valve), spin-on type.
 - e. Oil dipstick system that allows lubricating oil level to be checked while engine is running and stopped.
 - f. Governor which maintain speed at precise isochronous control for 60 Hz operation. The frequency at any constant load (including no load) shall remain within a steady state band width of ± 0.25 percent of rated frequency. Frequency modulation (defined as the number of times per second that the frequency varies from the average frequency in cyclic manner) shall not exceed one cycle per second.

- E. Engine Control and Instrumentation:
 - 1. Timer for selective number of cranking cycles.

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2. Circuit for bypassing oil pressure protective device during starting.
 3. Selector switch for stop, automatic and manual positions.
 4. Indicating Instruments and Safety Devices:
 - a. Audible alarm to sound when any safety device operates.
 - b. High water temperature cutout and indicating light.
 - c. Low lube oil pressure cutout and indicating light.
 - d. Overspeed shutdown and indicating light.
 - e. Overcranking cutout and indicating light.
 - f. Alarm system reset.
 - g. Lamp test switch.
 - h. Lubricating oil pressure gage.
 - i. Jacket water temperature gage.
 - j. Running time meter.
 - k. Sensor and warning device to indicate jacket water temperature below 70 degrees F.
 - l. Battery charger failure
 - m. Low fuel (alarm).
 5. Auxiliary contacts or relays to control opening and closing of motorized dampers.
 6. 16 Point Remote Annunciator Panel.
 7. Include five auxiliary dry contacts for remote monitoring of generator to include:
 - a. Low Fuel
 - b. Generator Running
 - c. Generator Failed to Start
 - d. Low Battery
 - e. General Fault
 8. Engine gages and control switches may be installed directly on an engine mounted panel or on instrument panel of an engine starting control panel.
 - a. Locate panel so that it may be observed conveniently by Facility operating personnel.
- F. Engine Cooling and Heating Equipment:
1. Unit mounted radiator:
 - a. Cooling core mounted vertically.
 - b. Factory test pressure of 20 pounds per square inch, operating pressure as required by the engine manufacturer.
 - c. Maximum operating temperature of 250 degrees F.
 - d. Cooling core guard.
 - e. OSHA approved fan guard.
 - f. Surge tank as recommended by radiator manufacturer.
 - g. Sight glass for coolant level indication.
 2. Water cooled exhaust manifold or other suitable means (insulating blankets, etc.) to protect personnel from hot exhaust parts, to prevent excessive heat rejection to the room from the exhaust manifold and to prevent excessive heat build-up in engine and accessories due to lack of cooling air flow over engine and accessories.
 3. Permanent type anti-freeze (ethylene glycol) for the cooling system; Dow Chemical Co.'s Dow Therm SR-1. Coolant mixture suitable for use to minus 50 degrees F.

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4. Engine mounted radiator system and pusher type fan designed to cool the jacket water and lubricating oil.
 5. Radiator flange for duct connection.
 6. Permanent type anti-freeze (ethylene glycol) for the cooling system as manufactured by Dow Chemical Co. or Union Carbide. Coolant mixture suitable for use to minus 50 degrees F.
 7. Coolant conditioner corrosion prohibitive chemical additive which controls acidity, softens water and leaves protective film on cooling passages. Type and method of application as recommended by engine manufacturer.
 8. Thermostatically controlled electric water jacket heater in the cooling system to maintain engine temperature at minimum 70 degrees F.
 9. Lube oil cooler.
- G. Engine Exhaust Equipment:
1. Silencer: Suitable for critical noise areas; Burgess-Manning's BEO, Donaldson Co. Inc.'s TCU, Riley-Beaird Inc.'s Maxim Model M41, or Universal Silencer's EN5 with:
 - a. Flanges.
 - b. Hangers and supports (vibration isolation type).
 2. Exhaust Pipe: Schedule 40 black steel pipe with:
 - a. Corrugated (bellows) stainless steel flexible section for connection between exhaust manifold and exhaust pipe.
 - b. Hangers and supports.
 - c. Rain cap (vertical pipe).
 3. Insulation: 3 inch thick calcium silicate pipe insulation; Manville's Thermo-12, or Owens-Corning's Kaylo with Type 304 stainless steel metal jacketing, 0.010 inch thick, held in place with snap-in locking joints and stainless steel bands with snap straps.
- H. Alternator and Accessories: Multipole, revolving field alternator meeting NEMA Standards, having:
1. Brushless solid state permanent magnet (PMG) exciter system.
 2. Temperature compensated solid state voltage regulator. Voltage regulation within plus or minus 2 percent of rated voltage from no load to full load. Transient voltage dip not greater than 20 percent of rated voltage when full load at rated power factor is applied to the alternator.
 3. Stable alternator operating conditions reestablished within 2 seconds following any change in load between no load and full load or between full load and no load.
 4. Temperature rise in accordance with NEMA MG1-22.40, determined by resistance method, rated on standby duty basis, reference ambient temperature 40 degrees C (Class F insulation system 130 degrees C maximum rise; Class H insulation system 150 degrees C maximum rise).
 5. Rheostat for plus or minus 5 percent voltage adjustment.
 6. Amortisseur windings, suitable for paralleling.
 7. Alternator directly connected to engine and driven through a semi-flexible driving flange.
 8. Main circuit breaker mounted on unit, or on mounting frame adjacent to unit.

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Circuit breaker shall meet the requirements of Section 16417 - Enclosed Circuit Breakers. Breaker shall be rated 65,000AIC. The breaker shall be kirk-keyed with the mobile generator docking station.

9. Instruments in panel, shock mounted on the unit:
 - a. Frequency meter.
 - b. Rheostat Control.
 - c. AC voltmeter.
 - d. AC ammeter.
 - e. Individual or combination type selector switches for the voltmeter and ammeter.
 - f. Panel lights and switch.

2.02 BATTERIES AND ACCESSORIES

- A. Lead Acid batteries; with:
 1. Number of cell units as required for voltage of starting system (Cell voltage shall be based on 1.2 volts per cell).
 2. Plastic cell containers.
 3. Ampere-hour capacity as recommended by engine manufacturer for a minimum of 3 consecutive starting attempts of 15 seconds each.
 4. Ampere-hour capacity as recommended by engine manufacturer for 60 seconds of continuous cranking. Note: Engine overcrank device shall terminate cranking with enough reserve power to permit additional cranking after an investigation to find the reason for a failure to start.
 5. Full ampere-hour capacity delivered at ambient temperature of 32 degrees F.
 6. Provide battery wrap or pad heaters with thermostat.
- B. Battery Charger: Constant voltage, current limiting type as recommended by the battery manufacturer, having:
 1. Fully automatic, 2 rate (float and high-rate/equalize) charging control.
 2. DC ammeter.
 3. DC voltmeter.
 4. High-rate indicator light.
 5. Common audible alarm and individual indicating lights (with provision for connection to remote annunciator) for:
 - a. Ground fault (if ungrounded type dc system).
 - b. AC input failure.
 - c. Low dc voltage.
 - d. High dc voltage.
 - e. No dc voltage at batteries.
 6. Remote annunciator panel with common audible alarm and individual indicating lights for:
 - a. Ground fault (if ungrounded type dc system).
 - b. AC input failure.
 - c. Low dc voltage.
 - d. High dc voltage.
 - e. No dc voltage at batteries.

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7. Common audible alarm and individual indicating lights for:
 - a. Ground fault (if ungrounded type dc system).
 - b. AC input failure.
 - c. Low dc voltage.
 - d. High dc voltage.
 - e. No dc voltage at batteries.

C. Battery Rack: As recommended by battery manufacturer.

2.03 HOUSING

- A. Unit shall be provided with a factory weatherproof level 1 sound attenuated housing to completely enclose unit, having:
1. All equipment and devices installed within the housing (except muffler) including main circuit breaker, batteries, etc. connected and ready for use as complete package.
 - a. Sound attenuation shall be as follows:
 1. 75 dBA at 23 feet
 2. Base:
 - a. Minimum 6 inch channel iron with minimum 4 inch, 11 gage formed crossmembers.
 - b. Painted with black epoxy
 - c. Lifting hooks.
 - d. Grounding lugs.
 - e. Rodentproof skirt.
 3. Walls and Roof:
 - a. Minimum 14 gauge steel exterior pan. Color of exterior white.
 - b. Acoustic composite foam insulation (R value 19.8).
 - c. Minimum 50 pounds per sq. ft. snow loading for roof.
 - d. Zinc plated or stainless steel fasteners
 5. Insulated exterior door Doors equipped with key lock exterior latch handle.
 6. All doors hinged. Hinges constructed of brass or stainless steel.
 7. Exterior Emergency stop button.
 8. Oil and coolant piped to outer perimeter of engine.
 9. Crankcase breather and day tank vented to outside of housing.
 10. Exhaust silencer with tail pipe and bird screen, mounted internally in housing.
 11. All wiring from auxiliary equipment (water jacket heater, battery pad heater, alternator strip heater, etc.) to diesel-alternator designated control terminal strip. Contractor shall supply 120/208 volt 50 amp circuit for accessory power.
 12. Housing shall include an aluminum platform and stairs for single door access to unit.

2.04 ENGINE FUEL EQUIPMENT

- A. Base Tank:
1. UL 142 Listed
 2. 24 hour minimum capacity at 100% load.

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DIESEL-ALTERNATOR EMERGENCY SYSTEM

3. Double Walled with leak detection & alarm.
4. Level switches for:
 - a. High Level – Alarm
 - b. Low Level – Alarm
5. Standard and emergency vents

2.05 REMOTE ANNUNCIATOR

- A. Provide remote alarm annunciator to meet NFPA 110.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Connections: Make all connections to unit with flexible connections designed for the specific purpose.
- B. Diesel Fuel:
 1. Provide diesel fuel as required to initially fill the fuel belly tank before commencing the preliminary system test.
 2. Upon completion of all tests provide additional diesel fuel as required to fill the belly tank.
 3. Diesel fuel shall have characteristics as recommended by the diesel-alternator unit engine manufacturer.
- C. Phase Relationship: Correctly phase emergency and normal service so that motor rotation will not reverse upon transfer from normal to emergency feeder.

3.02 FIELD QUALITY CONTROL

- A. Preliminary System Test:
 1. Preparation: Have the Company Field Advisor adjust the completed system (with the contract automatic transfer switch connected). Coordinate with automatic transfer switch company field advisor switch/system test requirements. Operate it long enough to assure that it is performing properly.
 2. Run a preliminary test for the purpose of:
 - a. Determining whether the system is in a suitable condition to conduct an acceptance test.
 - b. Checking and adjusting equipment.
 - c. Training facility personnel.
- B. System Acceptance Test:
 1. Preparation: Coordinate test with automatic transfer switch manufacturer and notify the Owner's Representative at least 3 working days prior to the test so arrangements can be made to have a Facility Representative witness the test.
 2. Make the following tests:

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- a. Test each system function step by step as summarized under SYSTEM DESCRIPTION.
 - b. Test starting system and battery capacity. Crank engine for the required time and number of consecutive starting attempts.
 - c. Load test at unity (1.0) power factor and rated voltage in the following sequence (run each test segment continuously):
 - 1) One hour at half load.
 - 2) One hour at three-quarters load.
 - 3) Four hours at full load.
 - 4) During the test period take voltage, current, frequency and all engine instrument readings and record results at the beginning and end of test and at fifteen minute intervals during test.
 - d. Measure fuel consumption during the full load test period.
3. Supply an adjustable resistive load bank or other approved apparatus to load unit for variations of test loads.
 4. Supply equipment necessary for system adjustment and testing.
 5. Submit written report of test results signed by Company Field Advisor and the Owner's Representative.

3.03 TRAINING

- A. The engine manufacturer's local representative shall provide eight hours of on-site training for appropriate site personnel. Training shall include maintenance, parts ordering, safety, operation, troubleshooting, and a complete review of operation and service manuals.

PART 4 WARRANTY AND SERVICE

4.01 GENERATOR WARRANTY

- A. Generator shall be supplied with a five years part, labor and mileage warranty covering the generator set and all accessories.
- B. Warranty period shall commence after the generator has been successfully acceptance tested.

4.02 SERVICE CONTRACT

- A. A service contract shall be included with the purchase of the Generator. The service contract shall cover all factory recommended service and maintenance. Minimum service shall include annual inspection and maintenance as well as all repairs and service recommended as a result of said annual inspection.
- B. The service contract shall cover a period of two years after the unit has successfully completed on-site acceptance testing.

END OF SECTION

SECTION 16272
TRANSFORMERS – DRY TYPE, UNDER 600V

PART 1 GENERAL

1.01 REFERENCES

- A. NEMA, ANSI, IEEE, and UL.

1.02 SUBMITTALS

- A. Submittals Package:
1. For Transformers Rated 75KVA and Below: Submit the product data, and quality control submittals specified below all at the same time as a package.
- B. Product Data: Catalog sheets, specifications and installation instructions.
- C. Quality Control Submittals:
1. Transformers Rated 75KVA and Below: Submit certified report of the Company's routine commercial NEMA tests for each type transformer.
- D. Contract Closeout Submittals:
1. Operation and Maintenance Data: Deliver 2 copies, covering the installed products, to the Owner's Representative.
 2. Energy Efficiency Rebate Documentation:
 - a. Deliver 2 copies of documentation to the Owner's Representative showing the costs associated with purchase of any Energy Star labeled transformers.
 - 1) Submittal of confidential or proprietary documentation may be accommodated thru the rebate organization's legal declarations.
 - b. The documentation will be forwarded to Facility supervisory personnel for their use in pursuing energy efficiency rebate incentive funds that may be, or may become, available during the course of this Contract thru organizations such as:
 - 1) New York State Energy Research and Development Authority (NYSERDA): New York Energy Smart program (518) 862-1090, www.nyserda.org.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Storage of Transformers: Provide supplemental heating devices, such as incandescent lamps or low wattage heaters within the enclosure or under a protective covering to control dampness. Maintain this protection from the time equipment is delivered to the site until it is energized.

SECTION 16272
TRANSFORMERS – DRY TYPE, UNDER 600V

PART 2 PRODUCTS

2.01 DRY TYPE TRANSFORMERS

- A. By Acme Electric Corp. Power Products Div., Cutler-Hammer Inc., General Electric Co., Jefferson Electric Inc., Niagara Transformer Corp., Sola/Hevi-Duty Unit of General Signal, or Square D Co.:
 - 1. Two winding insulating type construction.
 - 2. Labeled for EPA Energy Star Program (based on NEMA TP1 Guide for Determining Energy Efficiency for Distribution Transformers), except where a specific type of dry type transformer is indicated on the drawings.
 - 3. Enclosures For Transformers Installed In Dry Protected Locations (unless otherwise indicated):
 - a. Ventilated enclosure for transformers rated over 10KVA.
 - b. Enclosures for transformers rated 10KVA and under may be ventilated or non-ventilated.
 - 4. Enclosure For Transformers In Damp Locations (unless otherwise indicated):
 - a. Outdoor/ventilated enclosure equipped with weathershields for transformers rated over 10KVA.
 - b. Enclosures for transformers rated 10KVA and under may be ventilated enclosure equipped with weathershields or non-ventilated.
 - 5. Primary Taps (minimum of): 3-15KVA two-5 percent FCBN, over 15 KVA four 2-1/2 percent FCBN and two 2-1/2 percent FCAN.
 - 6. Mounting accessories.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install dry type transformers where indicated on the drawings.

END OF SECTION

SECTION 16412
SAFETY SWITCHES

PART 1 GENERAL

1.01 SUBMITTALS

- A. Product Data: Catalog sheets, specifications and installation instructions.

PART 2 PRODUCTS

2.01 SAFETY SWITCHES (SINGLE THROW)

- A. NEMA 1, 3R, 4 (Stainless Steel), 12: Challenger's Heavy Duty Series, Cutler-Hammer Inc.'s DH, General Electric Co.'s Type TH, or Square D Co.'s Heavy Duty Series, having:
1. Fuses, or unfused as indicated on drawings.
 2. Fused switches equipped with fuseholders to accept only the fuses specified in Section 16416 (UL Class RK-1, RK-5, L).
 3. NEMA 1 enclosure unless otherwise indicated on drawing.
 4. 240V rating for 120V, 208V, or 240V, circuits.
 5. 600V rating for 277V, or 480V circuits.
 6. Solid neutral bus when neutral conductor is included with circuit.
 7. Ground bus.
 8. Current rating and number of poles as indicated on drawings.
- B. NEMA 4X: Crouse-Hinds Co.'s NST, or Square D Co.'s Special Application Safety Switches; having:
1. Fuses, or unfused as indicated on drawings.
 2. Fused switches equipped with fuseholders to accept only the fuses specified in Section 16416 (UL Class RK-1, RK-5, L).
 3. Molded fiberglass-reinforced polyester NEMA 4X enclosure.
 4. 240V rating for 120V, 208V, or 240V, circuits.
 5. 600V rating for 277V, or 480V circuits.
 6. Solid neutral bus when neutral conductor is included with circuit.
 7. Ground bus.
 8. Current rating and number of poles as indicated on drawings.

2.02 NAMEPLATES

- A. General: Precision engrave letters and numbers with uniform margins, character size minimum 3/16 inch high.
1. Phenolic: Two color laminated engravers stock, 1/16 inch minimum thickness, machine engraved to expose inner core color (white).
 2. Aluminum: Standard aluminum alloy plate stock, minimum .032 inches thick, engraved areas enamel filled or background enameled with natural aluminum engraved characters.
 3. Materials for Outdoor Applications: As recommended by nameplate manufacturer to suit environmental conditions.

SECTION 16412
SAFETY SWITCHES

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install switches so that the maximum height above the floor to the center of the operating handle does not exceed 6'-6".
- B. Identify each safety switch, indicating purpose or load served:
 - 1. NEMA 1 Enclosures: Rivet or bolt nameplate to the cover.
 - 2. NEMA 12 Enclosures: Rivet or bolt and gasket nameplate to the cover.
 - 3. NEMA 3R, 4, 4X Enclosures: Attach nameplate to the cover using adhesive specifically designed for the purpose, or mount nameplate on wall or other conspicuous location adjacent to switch. Do not penetrate enclosure with fasteners.

END OF SECTION

SECTION 16414
AUTOMATIC TRANSFER SWITCH

PART 1 GENERAL

Include in this project shall be one automatic transfer switch. The auto transfer switches shall be connected to the new 1000KW, 480V, 3phase generator and reside in the control room.

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Diesel-Alternator Emergency System: Section 16231.
- B. Switchboards: Section 16441.

1.02 REFERENCES

- A. UL 1008 listed, CSA certified.
- B. NFPA 70- National Electric Code
- C. NFPA 110.
- D. NEMA Standard ICS2-447-AC Transfer Switches.
- E. IEEE Standard 446.
- F. NEC Articles 700,701, 702
- G. ISO 9001.

1.03 TRANSFER SWITCH OPERATING DESCRIPTION

- A. Design Criteria: The transfer switch is required to:
 - 1. Transmit signals to the diesel-alternator indicating when the unit should start and stop.
 - 2. The automatic transfer switch shall have provisions to transfer supply to emergency loads in the facility between the normal source (utility feed) and the standby source (diesel generator package). In phase voltage monitoring shall be provided to control switch operation between two energized sources.
 - 3. The automatic transfer switch shall have provisions to test the diesel-alternator unit under load and unloaded. A selector switch shall be provided for "TEST UNDER LOAD" and "TEST UNLOADED".
 - 4. The automatic transfer switch shall have provisions to automatically test the diesel-alternator unit on a scheduled basis, as well as to manually initiate a test. A "MANUAL/OFF/AUTOMATIC" Test selector switch as well as "PUSH TO START TEST" and "PUSH TO STOP TEST" pushbuttons shall be provided.
 - 5. Provisions shall be provided to select the frequency (daily/weekly/monthly) and the day of the month/week and time of day that the automatic testing is initiated.
 - 6. Indication shall be provided for availability of both the "Normal" and "Emergency" sources.
 - 7. Indication shall be provided for the switch position – "Normal" or "Emergency".

SECTION 16414
AUTOMATIC TRANSFER SWITCH

8. Provide remote alarm and indication capability.
9. Controls using touch screen controller are acceptable, if not provided then physical switches and buttons will be required.

B. Description of Operation – Automatic Operation:

1. The transfer switch monitors electrical parameters of normal and emergency feeders.
2. In normal operating condition, the mechanism of the transfer switch is in the normal position and the diesel-alternator (Section 16231) unit shut down. Sequence of transfer operation occurs as follows:
 - a. The voltage on any phase of the normal feeder drops below 85 percent of normal, initiating in the transfer switch after an adjustable time delay (set at 2 seconds) to ride through voltage fluctuations and momentary outages.
 - b. At the end of the adjustable time delay, the diesel-alternator unit is signaled to automatically start.
 - c. A voltage-frequency device in the transfer switch prevents transfer until the emergency feeder voltage rises to 90 percent of normal and the frequency reaches 95% nominal.
 - d. The transfer switch transfers load to the emergency feeder.
 - e. Complete transition from onset of normal feeder failure to emergency feeder transfer shall not exceed 10 seconds.
 - f. When voltage on all phases of the normal feeder is restored to 90 percent voltage, transfer from emergency to normal feeder is initiated after an adjustable time delay (set at 30 minutes) in the transfer switch.
 - g. The transfer switch transfers load to the normal feeder at the end of the time delay provided that the in phase monitor is satisfied. Exception: If the emergency power source should fail and the normal power source has been restored, retransfer to the normal source of power shall be immediate, by passing the retransfer delay timer.
 - h. The unit continues to run unloaded 5 minutes, after which the control equipment shuts down the engine and resets the system.
 - i. Permanently attached manual operating handle(s) allow for safe manual transfer under load. The switch operating speed is the same operated electrically or manually.

C. Description of Operation – Generator/Transfer Switch Test:

1. Automatic Test:
 - a. With the Test Selector Switch in the “AUTOMATIC” position the generator shall be exercised as follows on a scheduled basis.
 1. When the time specified on the test scheduler occurs the diesel-alternator unit is signaled to automatically start.
 2. With the load selector switch in the “TEST UNLOADED” position the generator runs unloaded for the length of time established above for retransferring load to the Normal Source (set at 30 minutes) after which the generator shuts down.
 3. With the load selector switch in the “TEST UNDER LOAD” position an auxiliary device (in-phase monitoring or programmed transition) in

SECTION 16414
AUTOMATIC TRANSFER SWITCH

the transfer switch assures the normal and emergency power sources are synchronized.

4. The transfer switch transfers load to the emergency generator.
 5. Complete transition from onset of normal feeder failure to emergency feeder transfer shall not exceed 10 seconds.
 6. The generator carries the load for 30 minutes (as described above), after which the generator synchronizes with the normal (utility) source and the transfer switch operates to connect the load to the utility.
 7. The generator continues to run unloaded in the cool down mode for 5 minutes after the load is transferred to the normal source before the transfer switch sends a command to shut down the engine.
2. Manually Initiated Test:
- a. With the Test Selector Switch in the “MANUAL” position the generator shall be exercised as follows:
 1. When the “PUSH TO START TEST” button is pressed the diesel-alternator unit is signaled to start.
 2. With the load selector switch in the “TEST UNLOADED” position the generator runs unloaded for the length of time established above for retransferring load to the Normal Source (set at 30 minutes) after which the generator shuts down.
 3. With the load selector switch in the “TEST UNDER LOAD” position an auxiliary device (in-phase monitoring or programmed transition) in the transfer switch assures the normal and emergency power sources are synchronized.
 4. The transfer switch transfers load to the emergency generator.
 5. Complete transition from onset of normal feeder failure to emergency feeder transfer shall not exceed 10 seconds.
 6. The generator carries the load until the “PUSH TO STOP TEST” pushbutton is pressed, after which the generator synchronizes with the normal (utility) source and the transfer switch operates to reconnect the load to the utility.
 7. The generator continues to run unloaded in the cool down mode for 5 minutes after the load is transferred to the normal source before the transfer switch sends a command to shut down the engine.

1.04 SUBMITTALS

- A. Submittals Package: Submit the product data, shop drawings, and quality control submittals specified below at the same time as a package.
- B. Shop Drawings:
 1. Installation details (coordination with connected equipment).
- C. Product Data:
 1. Catalog sheets, specifications and installation instructions.
 2. Bill of materials.

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AUTOMATIC TRANSFER SWITCH

3. Detailed sequence of operations (format similar to TRANSFER SWITCH OPERATING DESCRIPTION).
 4. Company's data indicating maintenance schedule.
 5. Name, address and telephone number of nearest fully equipped service organization.
- D. Quality Control Submittals:
1. Design Data:
 - a. Company's data indicating the switch will meet the requirements of 1.03 B.
 - b. Certified data from the Company proving that the switch will meet the requirements of 1.03 A. Design Criteria.
 2. Company Field Advisor Data: Include:
 - a. Name, business address and telephone number of Company Field Advisor secured for the required services.
 - b. Certified statement from the Company listing the qualifications of the Company Field Advisor.
 - c. Services and each product for which authorization is given by the Company, listed specifically for this project.
 3. Completed Installation List.
- E. Contract Closeout Submittals:
1. Operation and Maintenance Data: Deliver 2 copies, covering the installed product, to the Owner's Representative. Include name, address and telephone number of nearest fully equipped service organization.
 2. Test Report: Switch/System acceptance test report.
 3. Certificate: Affidavit, signed by the Company Field Advisor, certifying that the switch operation with the related equipment meets the contract requirements and is operating properly.

1.05 QUALITY ASSURANCE

- A. List of Completed Installations: If brand names other than those specified are proposed for use, furnish the name, address and telephone number of a least 5 comparable installations which can prove the proposed products have operated satisfactorily for 3 years.
- B. Company Field Advisor: Secure the services of a Company Field Advisor for a minimum of 8 working hours for the following:
1. Render advice regarding installation and final adjustment of the switch.
 2. Witness final switch/system test and then certify with an affidavit that the switch is installed in accordance with the contract documents and is operating properly.
 3. Train facility personnel on the operation and maintenance of the switch (minimum of one 2 hour session).
 4. Explain available service programs to facility supervisory personnel for their consideration.
- C. Service Availability: A fully equipped service organization capable of guaranteeing

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AUTOMATIC TRANSFER SWITCH

response time within 8 hours to service calls shall be available 24 hours a day, 7 days a week to service the completed Work.

1.06 MAINTENANCE

A. Spare Parts:

1. Special tools if required for the regular maintenance and minor repairs of the switch.

1.07 WITHSTAND AND CLOSE RATINGS:

- A. The ATS shall be rated to close on and withstand the available rms symmetrical short circuit current at the ATS terminals with the type of overcurrent protection shown on the plans. WCR ATS ratings as be as follows when used with specific circuit breakers:

ATS Size	Withstand & Closing Rating MCCB	W/CURRENT LIMITING FUSES
30	22,000A	100,000
70 - 200	22,000A	200,000
230	22,000A	100,000
260 – 400	42,000A	200,000
600 – 1200	65,000A	200,000
1600 – 2000	85,000A	200,000
2600 – 3000	100,000A	200,000

PART 2 PRODUCTS

2.01 AUTOMATIC TRANSFER SWITCH

- A. Automatic Switch Co.'s ASCO 300 Series with Group G Controller, Russelectric Inc.'s, Model RMT, or Zenith Controls Inc.'s ZTS, with:
1. Double throw construction.
 2. Ratings as indicated on drawings.
 3. Accessories to perform the functions specified in TRANSFER SWITCH OPERATING DESCRIPTION.
 4. NEMA 1 enclosure.
 5. Electrically operated and mechanically held.
 6. Auto transfer switch shall be a delayed transition switch allowing for a programmed transition.
 7. Adjustable time delay, 0-6 seconds, to override momentary outages before initiating engine starting. Once engine is signaled to start it must run for at least the duration of the time delay before engine shut down.
 8. Adjustable time delay, 0-30 minutes, on retransfer to normal feeder with bypass of time delay in event of emergency feeder failure.
 9. Adjustable time delay, 0-10 minutes, on engine cool down.
 10. Adjustable time delay, 0-5 seconds, on transfer to emergency feeder.
 11. Test switch, momentary type, (permanent type are acceptable when accompanied

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AUTOMATIC TRANSFER SWITCH

by flashing red lights at the transfer switch and generator set to indicate switch is not in automatic mode), to simulate normal feeder failure (unit to start and transfer to emergency feeder).

12. In-phase Monitor, or Programmed Transition (Programmed transition adjustable 0-6 second time delay, factory set at 2 seconds).
13. Presignal transfer time delay contact closure (time adjustable, factory set at 15 seconds).
14. Two identified pilot lights to indicate switch position (green normal, red emergency).
15. Start contacts, silver plated.
16. Auxiliary contact on main shaft (closed on normal).
17. Auxiliary contact on main shaft (closed on emergency).
18. Automatic exerciser for exercising the referenced diesel-alternator engine (no transfer to emergency feeder), minimum 30 minutes every 168 hours (7 days).
19. Equipment ground lug.
20. Communications interface to work with the Remote Annunciator.
21. Include auxiliary dry contacts for remote monitoring to include:
 - a. General ATS fault
 - b. Failed to Transfer
 - c. On Backup Power
22. Live parts shielded from personnel when door is open.

2.02 NAMEPLATES

- A. General: Precision engrave letters and numbers with uniform margins, character size minimum 3/16 inch high as indicated on the One Line Diagram.
 1. Phenolic: Two color laminated engravers stock, 1/16 inch minimum thickness, machine engraved to expose inner core color (black letters on white background).

2.03 GENERATOR DOCKING STATION

- A. General: Unit shall be capable of accepting a 1200A, 480V feed from a mobile generator.
 1. Unit shall be located outdoors and shall be NEMA 3R rated.
 2. Unit shall include connections for 120V power for the mobile generator block heater and battery charger.
 3. Unit shall include control connections for automatically calling the generator to run, run status output, and fault outputs.
 4. The unit shall come equipped with twelve 100 foot portable power cables capable of 400A each color coordinated per phase. The cables shall be equipped with camlock connection ends. The unit shall also include portable ground and neutral cable capable of carrying the rated current.
 5. Unit shall be a TRYSTAR GDS model or equal.
 6. Unit shall include a kirk-key lock which shall be keyed to the generator breaker.

SECTION 16414
AUTOMATIC TRANSFER SWITCH

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install all required engine starting signal circuitry from switches to engine start conductor junction box. Engine start signal shall be transmitted automatically upon loss of normal source voltage. The start signal shall prevent dry cranking of the generator by requiring the generator to reach proper output and run for at least the duration of the cool-down timer.
- B. Install switch so that the maximum height above the floor to the center of the operating handle does not exceed 6'-0".
- C. Identify switch, indicating designation, load served and normal feeder designation, by riveting or bolting nameplate to cover.
- D. Install Remote Annunciator panel at location indicated.

3.02 FIELD QUALITY CONTROL

- A. Preliminary Switch/System Test:
 - 1. Preparation: Have the Company Field Advisor adjust the switch for the completed system (including the related equipment) and then operate it long enough to assure that it is performing properly.
 - 2. Run a preliminary test for the purpose of:
 - a. Determining whether the switch is in a suitable condition to conduct an acceptance test.
 - b. Checking and adjusting equipment.
 - c. Training facility personnel.
- B. Switch/System Acceptance Test:
 - 1. Preparation: Coordinate test with related equipment manufacturer and notify the Owner's Representative at least 3 working days prior to the test so arrangements can be made to have a Facility Representative witness the test.
 - 2. Make the following tests:
 - a. Test each switch function step by step as summarized under TRANSFER SWITCH OPERATING DESCRIPTION.
 - 3. Submit written report of test results signed by Company Field Advisor and the Owner's Representative. Give a copy of the final report to the Owner's Representative.

PART 4 WARRANTY

4.01 WARRANTY

SECTION 16414
AUTOMATIC TRANSFER SWITCH

- A. The automatic transfer switch shall be supplied with a two years part, labor and mileage warranty covering the automatic transfer switch and all accessories.
- B. Warranty period shall commence after the automatic transfer switch has been successfully acceptance tested.

END OF SECTION

SECTION 16416
FUSES

PART 1 GENERAL

1.01 SUBMITTALS

- A. Product Data: Catalog sheets, specifications and installation instructions.

1.02 MAINTENANCE

- A. Spare Parts:
1. Six spare fuses of each size and category, including any accessories required for a complete installation.
 2. Special tools if required for installation or removal of fuses.

PART 2 PRODUCTS

2.01 FUSEHOLDERS

- A. Equipment provided shall be furnished with fuseholders to accommodate the fuses specified.

2.02 FUSES RATED 600V OR LESS

- A. Fuses for Safety Switches (Motor Circuits) and Service Disconnects:
1. Cartridge Type (250 Volts, 600 Amperes or Less): Dual element time-delay, UL Class RK-5, 200,000 amperes R.M.S. symmetrical interrupting capacity:
 - a. Cooper Industries Inc.'s/Bussman Div. Type FRN-R.
 - b. Gould Inc.'s/Circuit Protection Div. (Shawmut) Type TR-R.
 - c. Littlefuse Inc.'s Type FLN-R.
 2. Cartridge Type (600 Volts, 600 Amperes or Less): Dual element time-delay, UL Class RK-5, 200,000 amperes R.M.S. symmetrical interrupting capacity:
 - a. Cooper Industries Inc.'s/Bussmann Div. Type FRS-R.
 - b. Gould Inc.'s/Circuit Protection Div. (Shawmut) Type TRS-R.
 - c. Littlefuse Inc.'s Type FLS-R.
 3. Cartridge Type (600 Volts or Less - Above 600 Amperes): Current limiting, UL Class L, 200,000 amperes R.M.S. symmetrical interrupting capacity:
 - a. Cooper Industries Inc.'s/Bussmann Div. Type KTU.
 - b. Gould Inc.'s Circuit Protection Div. (Shawmut) Type A4BY.
 - c. Littlefuse Inc.'s Type KLP-C.
- B. Fuses for Safety Switches (Lighting and Heating Circuits):
1. Cartridge Type (250 Volts): Single element, UL Class RK-1, 200,000 amperes R.M.S. symmetrical interrupting capacity:
 - a. Cooper Industries Inc.'s/Bussmann Div., Type KTN-R.
 - b. Gould Inc.'s/Circuit Protection Div. (Shawmut) Type A2K-R.
 - c. Littlefuse Inc.'s Type KLN-R.
 2. Cartridge Type (600 Volts): Single element, UL Class RK-1, 200,000 amperes

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FUSES

R.M.S. symmetrical interrupting capacity:

- a. Cooper Industries Inc.'s/Bussmann Div. Type KTS-R.
- b. Gould Inc.'s/Circuit Protection Div. (Shawmut) Type A6K-R.
- c. Littlefuse Inc.'s Type KLS-R.

2.03 FUSES RATED OVER 600V

- A. Fuses for Metal Enclosed Interrupter Switchgear:
 - 1. Current Limiting, Silver-Sand Type: General Electric Co.'s Type EJ.
 - 2. Boric-Acid Type: S & C Electric Co.'s Type SM with snuffler, or Westinghouse Elec. Corp.'s Type RBA with condenser.
- B. Fuses for Fused Load Break Interrupter Switches: General Electric Co. Type EJ, or S & C Electric Co.'s Type SM.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install fuses in respective equipment.

END OF SECTION

SECTION 16417
ENCLOSED CIRCUIT BREAKERS

PART 1 GENERAL

1.01 SUBMITTALS

- A. Product Data: Catalog sheets, specifications and installation instructions.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Enclosed Circuit Breakers: As produced by Square D Co., General Electric Co., or Westinghouse/Cutler Hammer Corp. having:
1. NEMA 1 enclosure unless otherwise indicated on the drawings.
 2. Solid neutral.
 3. Voltage rating, current rating, symmetrical current interrupt rating as indicated on drawing and number of poles as indicated on the drawings.
 4. Circuit breakers to suit requirements.
 5. Under 50 ampere trip element, enclosure has means to lock circuit breaker position on or off using standard padlock.
 6. Ampere trip elements 50 and above have industrial type enclosure with door and side handle. Handle position is lockable using standard padlock.

2.02 NAMEPLATES

- A. Phenolic: Engraved plates, minimum 3/4" wide and length as required by inscription: Seton Name Plate Corp.
- B. Stamped Metal: Standard stamped or embossed aluminum tags, minimum 3/4" wide and length as required by inscription: Tech Products, Inc.; Seton Name Plate Corp.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Mount enclosed circuit breakers on wall so that maximum height above the floor to the center of operating handle does not exceed 6-1/2'.
- B. Provide phenolic or stamped metal nameplates on cover of each enclosed circuit breaker indicating purpose or load served by the circuit breaker.

END OF SECTION

SECTION 16421
MOTOR CONTROL CENTERS

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Wiring, General – 600 Volts and Under: Section 16121.
- B. Pump Station Control System: Section 11750.
- C. Motor Controllers Section 16221

1.02 REFERENCES

- A. NEMA, AND UL.

1.03 SUBMITTALS

- A. Submittals Package: Submit the shop drawings, product data, and quality control submittals specified below at the same time as a package.
- B. Shop Drawings; include the following for each motor control center:
 - 1. Front and plan view with overall dimensions.
 - 2. Details showing type of construction and available conduit space.
 - 3. Voltage rating, and continuous current rating of the main horizontal bus and each vertical bus.
 - 4. Short-circuit current rating.
 - 5. Power and control wiring schematic diagrams (standard diagrams will not be accepted).
 - a. Deliver 2 copies of approved wiring diagrams to the Electric Contractor for installation of power wiring and connections required under the Electric Contract.
 - 6. Enumeration of each motor control unit, including number of poles, NEMA size, voltage rating, current rating, interrupting capacity and accessories.
 - a. Identify each unit for use with corresponding motor.
 - b. Describe overload devices being supplied with each controller (include equipment manufacturer's recommendations).
 - 7. A coordinated selective scheme between the main device and motor control units so that under fault conditions the motor control unit clears the fault while the main device remains closed.
 - 8. A statement for each motor control center indicating that it will bear a UL label.
- C. Product Data:
 - 1. Catalog sheets, specifications and installation instructions.
 - 2. Bill of materials.
 - 3. Name, address and telephone number of nearest fully equipped service organization.
- D. Quality Control Submittals:
 - 1. Company Field Advisor Data: Include:
 - a. Name, business address and telephone number of Company Field Advisor secured for the required services.

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MOTOR CONTROL CENTERS

- b. Certified statement from the Company listing the qualifications of the Company Field Advisor.
 - c. Services and each product for which authorization is given by the Company listed specifically for this project.
- E. Contract Closeout Submittals:
 - 1. System acceptance test report.
 - 2. Certificate: Affidavit, signed by the Company Field Advisor, certifying that the system meets the contract requirements and is operating properly.
 - 3. Operation and Maintenance Data: Deliver 2 copies, covering the installed products, to the Owner's Representative.

1.04 QUALITY ASSURANCE

- A. Equipment Qualifications For Products Other Than Those Specified:
 - 1. At the time of submission provide written notice to the Owner of the intent to propose an "or equal" for products other than those specified. Make the "or equal" submission in a timely manner to allow the Owner sufficient time to review the proposed product, perform inspections and witness test demonstrations.
 - 2. If products other than those specified are proposed for use furnish the name, address, and telephone numbers of at least 5 comparable installations that can prove the proposed products have performed satisfactorily for 3 years. Certify in writing that the owners of the 5 comparable installations will allow inspection of their installation by the Owner's Representative and the Company Field Advisor.
 - a. Make arrangements with the owners of 2 installations (selected by the Owner) for inspection of the installations by the Owner's Representative. Also obtain the services of the Company Field Advisor for the proposed products to be present. Notify the Owner a minimum of 3 weeks prior to the availability of the installations for the inspection, and provide at least one alternative date for each inspection.
 - b. Only references from the actual owner or owner's representative (Security Supervisor, Maintenance Supervisor, etc.) will be accepted. References from dealers, system installers or others, who are not the actual owners of the proposed products, are not acceptable.
 - 1) Verify the accuracy of all references submitted prior to submission and certify in writing that the accuracy of the information has been confirmed.
 - 3. The product manufacturer shall have test facilities available that can demonstrate that the proposed products meet the contract requirements.
 - a. Make arrangements with the test facility for the Owner's Representative to witness test demonstrations. Also obtain the services of the Company Field Advisor for the proposed product to be present at the test facility. Notify the Owner a minimum of 3 weeks prior to the availability of the test facility, and provide at least one alternative date for the testing.
 - 4. Provide written certification from the manufacturer that the proposed products are compatible for use with all other equipment proposed for use for this system and meet all contract requirements.

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MOTOR CONTROL CENTERS

- B. Company Field Advisor: Secure the services of a Company Field Advisor for a minimum of 8 working hours for the following:
 - 1. Render advice regarding motor control center installation, and final adjustment and testing of the motor control units.
 - 2. Witness final system test and then certify with an affidavit that the motor control center is installed in accordance with the contract documents and is operating properly.
 - 3. Train facility personnel on the operation and maintenance of the motor control units (minimum of two 4 hour sessions).
 - 4. Explain available service programs to facility supervisory personnel for their consideration.
- C. Service Availability: A fully equipped service organization shall be available to service the completed Work.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Protection: Provide supplemental heating devices, such as incandescent lamps or low wattage heaters within the enclosure or under a protective cover to control dampness. Maintain this protection from the time equipment is delivered to the site until it is energized.

1.06 MAINTENANCE

- A. Spare Parts:
 - 1. 30 percent spare lamps for indicating (pilot) lights.

PART 2 PRODUCTS

2.01 MOTOR CONTROL CENTERS

- A. Allen-Bradley Co.'s Centerline 2100 Centerline, Cutler-Hammer/Eaton Corp.'s Freedom 2100, General Electric Co.'s Evolution Series E9000 Line, or Square D Co.'s Model 6 having:
 - 1. Ratings as indicated on drawings.
 - 2. NEMA Class I-S Construction, Type B wiring.
 - 3. Vertical sections 90 inches high by width and depth to accommodate front mounted equipment.
 - 4. Circuit breaker main device:
 - a. Mounting: Stationary, individually mounted.
 - b. Style: Molded case, or power circuit breaker as required to accommodate the circuit breaker components.
 - c. Trip Device: Programmable solid state.
 - d. Interrupting Capacity: Equal to, or greater than the short circuit rating required for the motor control center.
 - e. Component Description: See motor control center One Line Diagram for specific components required for the circuit breaker main device. In addition to the specific components, equip the main device with

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additional components as required to achieve a coordinated selective scheme between the main device and the motor control units.

5. Copper horizontal bus, tin-plated.
6. Copper vertical bus, tin-plated.
7. Horizontal and vertical bus guards for deadfront construction (red glass polyester cover sheet isolation barriers with stab cutouts and snap-in covers).
8. Copper horizontal ground bus.
9. Copper vertical ground bus in each section.
10. Channel iron floor sills.
11. Control power, 120 V maximum, from control power transformer mounted within each motor control unit.
12. Motor Control Units: See motor control center One Line Diagrams for specific components required for each motor control unit.
 - a. Circuit Breakers: Molded case, or power circuit breaker, as required to accommodate the circuit breaker components.
 - b. Overload Devices: Manual reset solid-state type.
 - c. Local Control Devices (Push buttons, and 3 position hand-off-auto selector switches):
 - 1) Furnish heavy-duty devices to suit the requirements of the NEMA enclosure.
 - d. Types:
 - 1) Type FVNR: Single speed, full voltage, magnetic, non-reversing, combination circuit breaker/motor controller.
 - 2) Type 2S2W: 2 speed, 2 winding, full voltage, magnetic, non-reversing, combination circuit breaker/motor controller.
 - 3) Variable Frequency Drives – See 16221 Motor and Motor Controllers for specifications.
13. Accessories as required to perform power and control functions indicated on the drawings, and specified under the various systems encompassed by the motor control center.

2.02 REMOTE CONTROL STATIONS

- A. Heavy Duty: Start-Stop with pilot light unless otherwise indicated, in NEMA enclosure to suit conditions; Allen-Bradley Co.'s Bulletin 800T, Cutler-Hammer Products' 10250T, General Electric Co.'s CR104P, or Square D Co.'s Class 9001.

2.03 NAMEPLATES

- A. General: Precision engrave letters and numbers with uniform margins, character size minimum 3/16 inch high.
 1. Phenolic: Two color laminated engraver's stock, 1/16 inch minimum thickness, machine engraved to expose inner core color (black letters on white background).
 2. Materials for Outdoor Applications: As recommended by nameplate manufacturer to suit environmental conditions.

2.04 CONTROLS

- A. MCC Controls Supplied by Electrical Vendor
 1. Supply Fans SF1 and SF2 – Motor Starter, Breaker, Local Hand-Off-Auto

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selector switches, complete with start button, stop button, run, and fail pilot lights, elapsed time meter, running output to SCADA, inputs for remote start from switch, remote start from timer, remote start from tstat, control transformer, output to open two dampers, lockout on fire alarm input, output to SCADA for running and fault shall be provided for at the MCC sections.

2. Pump #1 #2, #3, and #4 – Breakers only.
3. Screen CP and Odor CP - Breakers only.
4. Unit Heaters - Breakers Only.
5. Booster Pump - Motor Starter, Breaker, Local Hand-Off-Auto selector switches, complete with start button, stop button, run, and fail pilot lights, elapsed time meter, running output to SCADA, inputs for remote start from pump station cp, control transformer, output to SCADA for running and fault shall be provided for at the MCC sections.

- B. E-Stop Switches shall be provided by the Electrical Contractor at the Pumps.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Control Wiring:
1. Provide all control wiring and connections.
- B. Power Wiring:
1. Electric Contractor will provide power wiring and connections.
- C. Motor Control Center:
1. Install motor control centers in accordance with NEMA Publication No. ICS 2.3 “Instructions for the Handling, Installation, Operation and Maintenance of Motor Control Centers”.
 2. Set and program the motor control center devices in accordance with the approved coordinated selective scheme.
- D. Identification:
1. Install on the front of each motor control unit, a nameplate indicating the motor control designation shown on the One Line Diagrams.
 2. Identify function of each pilot light and local control device.
 3. Identify each remote control station, indicating motor controlled.
 - a. NEMA 3R, 4, 4X, 7, or 9 Enclosures: Attach nameplates to the cover using adhesive specifically designed for the purpose, or mount nameplate on wall or other conspicuous location adjacent to switch. Do not penetrate enclosure with fasteners.

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MOTOR CONTROL CENTERS

3.02 FIELD QUALITY CONTROL

- A. Preliminary System Test:
 - 1. Preparation: Have the Company Field Advisor adjust the completed motor control centers and then operate them long enough to assure that they are performing properly.
 - 2. Run a preliminary test for the purpose of:
 - a. Determining whether motor control center is in a suitable condition to conduct an acceptance test.
 - b. Checking instruments and equipment.
 - c. Training facility personnel.
- B. System Acceptance Test:
 - 1. Preparation: Notify the Owner's Representative at least 3 working days prior to the test so arrangements can be made prior to the test to have a Facility Representative witness the test.
 - 2. Make the following tests:
 - a. Test programmable solid-state trip devices in accordance with the manufacturer's recommendations.
 - b. Demonstrate that each motor control unit performs its intended control function.
 - 3. Supply all equipment necessary for system adjustment and testing.
 - 4. Submit written report of test results signed by the Company Field Advisor and the Owner's Representative

3.03 REMOTE CONTROL STATION SCHEDULE

- A. Use heavy-duty remote control stations in all specified locations.

3.04 MOTOR CONTROL UNIT SCHEDULE

- A. See the One Line Diagram for Motor Control Center equipment required for the project.

END OF SECTION

SECTION 16441
SWITCHBOARDS

PART 1 GENERAL

1.01 REFERENCES

- A. NEMA, and UL.

1.02 SUBMITTALS

- A. Submittals Package: Submit the shop drawings, product data, and quality control submittals specified below at the same time as a package.
- B. Shop Drawings; include the following for each switchboard:
1. Front and plan view with overall dimensions.
 2. Details showing type of construction and available conduit space.
 3. Voltage rating, and continuous current rating of the through bus and distribution sections.
 4. Short-circuit current rating.
 5. Enumeration of each circuit breaker including frame size, ATE, number of poles, and interrupting capacity.
 6. Wiring and schematic diagrams.
 7. A coordinated selective scheme between the main device and feeder devices so that under fault conditions the feeder device clears the fault while the main device remains closed.
 8. A statement for each switchboard indicating that it will bear a UL label.
- C. Product Data:
1. Catalog sheets, specifications and installation instructions.
 - a. For devices equipped with ground fault protection, include information sheets describing system testing instructions and test form which comply with UL 891 requirements entitled "45. Field Testing of Ground Fault Protection of Equipment."
 2. Bill of materials.
 3. Name, address and telephone number of nearest fully equipped service organization.
- E. Quality Control Submittals:
1. Company Field Advisor Data: Include:
 - a. Name, business address and telephone number of Company Field Advisor secured for the required services.
 - b. Certified statement from the Company listing the qualifications of the Company Field Advisor.
 - c. Services and each product for which authorization is given by the Company listed specifically for this project.
- F. Contract Closeout Submittals:
1. System acceptance test report.
 2. Certificate: Affidavit, signed by the Company Field Advisor, certifying that the system meets the contract requirements and is operating properly.

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SWITCHBOARDS

3. Operation and Maintenance Data: Deliver 2 copies, covering the installed products, to the Owner 's Representative.

1.03 QUALITY ASSURANCE

- A. Equipment Qualifications For Products Other Than Those Specified:
 1. At the time of submission provide written notice to the Owner of the intent to propose an “or equal” for products other than those specified. Make the “or equal” submission in a timely manner to allow the Owner sufficient time to review the proposed product, perform inspections and witness test demonstrations.
 2. If products other than those specified are proposed for use furnish the name, address, and telephone numbers of at least 5 comparable installations that can prove the proposed products have performed satisfactorily for 3 years. Certify in writing that the owners of the 5 comparable installations will allow inspection of their installation by the Owner 's Representative and the Company Field Advisor.
 - a. Make arrangements with the owners of 2 installations (selected by the Owner) for inspection of the installations by the Owner 's Representative. Also obtain the services of the Company Field Advisor for the proposed products to be present. Notify the Owner a minimum of 3 weeks prior to the availability of the installations for the inspection, and provide at least one alternative date for each inspection.
 - b. Only references from the actual owner or owner’s representative (Security Supervisor, Maintenance Supervisor, etc.) will be accepted. References from dealers, system installers or others, who are not the actual owners of the proposed products, are not acceptable.
 - 1) Verify the accuracy of all references submitted prior to submission and certify in writing that the accuracy of the information has been confirmed.
 3. The product manufacturer shall have test facilities available that can demonstrate that the proposed products meet the contract requirements.
 - a. Make arrangements with the test facility for the Owner 's Representative to witness test demonstrations. Also obtain the services of the Company Field Advisor for the proposed product to be present at the test facility. Notify the Owner a minimum of 3 weeks prior to the availability of the test facility, and provide at least one alternative date for the testing.
 4. Provide written certification from the manufacturer that the proposed products are compatible for use with all other equipment proposed for use for this system and meet all contract requirements.
- B. Company Field Advisor: Secure the services of a Company Field Advisor for a minimum of 8 working hours for the following:
 1. Render advice regarding switchboard installation, and final adjustment of the switchboard devices.
 2. Witness final system test and then certify with an affidavit that the switchboard is installed in accordance with the contract documents and is operating properly.
 3. Train facility personnel on the operation and maintenance of the switchboard devices (minimum of two 1 hour sessions).
 4. Explain available service programs to facility supervisory personnel for their consideration.

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SWITCHBOARDS

- C. Service Availability: A fully equipped service organization shall be available to service the completed Work.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Protection: Provide supplemental heating devices, such as incandescent lamps or low wattage heaters within the enclosure or under a protective cover to control dampness. Maintain this protection from the time equipment is delivered to the site until it is energized.

PART 2 PRODUCTS

2.01 SWITCHBOARD

- A. Cutler-Hammer/Eaton Corp.'s Pow-R-Line C, General Electric Co.'s AV-3 Line, Siemens Type SB or Square D Co.'s QED, having:
1. Ratings as indicated on drawings.
 2. UL label "SUITABLE FOR USE AS SERVICE EQUIPMENT".
 3. Front accessibility.
 4. Sections flush at rear (rear alignment).
 5. Main device: Stationary circuit breaker (see circuit breaker paragraph).
 6. Fully rated copper bus bars.
 - a. Ampere rating of through bus not less than frame size of main device.
 7. Full length copper ground bus.
 8. Sections that are designated "space" or "provision for future breaker" equipped with all accessories required to accept a future circuit breaker.
 9. Space heaters with thermostatic control.
 10. Circuit Breakers:
 - a. Mounting: Group mounted, or individually mounted as necessary to accommodate the circuit breaker style and switchboard construction.
 - b. Style: Molded case, or power circuit breakers, as required to accommodate the circuit breaker components.
 - c. Trip Device: Programmable solid state.
 - d. Interrupting Capacity: Equal to, or greater than, the short circuit rating required for the switchboard.
 - e. Component Description: See switchboard One Line Diagram for specific components required for each circuit breaker. In addition to the specific components, equip each circuit breaker with additional components as required to achieve a coordinated selective scheme between the main device and the feeder devices.

SECTION 16441
SWITCHBOARDS

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install switchboards in accordance with NEMA Publication No. PB2.1 "Instructions for Proper Handling, Installation, Operation and Maintenance of Deadfront Distribution Switchboards".
 - 1. Set and program the switchboard devices in accordance with the approved coordinated selective scheme.
- B. Install foundation channels for anchoring and leveling of each switchboard.
- C. Identification:
 - 1. Install on the front of each switchboard, a phenolic nameplate with ½" high lettering indicating the designation of the switchboard as indicated on the One Line Diagram (black lettering on a white background).
 - 2. Install on the front of each circuit breaker, a phenolic nameplate indicating load served by circuit breaker (black lettering on a white background).

3.02 FIELD QUALITY CONTROL

- A. Preliminary System Test:
 - 1. Preparation: Have the Company Field Advisor adjust the completed switchboard devices and then operate them long enough to assure that they are performing properly.
 - 2. Run a preliminary test for the purpose of:
 - a. Determining whether the switchboard is in a suitable condition to conduct an acceptance test.
 - b. Checking instruments and equipment.
 - c. Training facility personnel.
- B. System Acceptance Test:
 - 1. Preparation: Notify the Owner's Representative at least 3 working days prior to the test so arrangements can be made prior to the test to have a Facility Representative witness the test.
 - 2. Make the following tests:
 - a. Test devices which have ground fault protection in accordance with the approved information sheets and test form.
 - b. Test programmable solid state trip devices in accordance with the manufacturer's recommendations.
 - 3. Supply all equipment necessary for system adjustment and testing.
 - 4. Submit written report of test results signed by the Company Field Advisor and the Owner's Representative.

END OF SECTION

SECTION 16442
PANELBOARDS

PART 1 GENERAL

1.01 REFERENCES

- A. NEMA, UL.

1.02 SUBMITTALS

- A. Submittal Packages: Submit the shop drawings, product data, and the quality control submittals specified below at the same time as a package.
- B. Shop Drawings; include the following for each panelboard:
1. Cabinet and gutter size.
 2. Voltage and current rating.
 3. Panelboard short circuit rating. Indicate if rating is Fully Rated Equipment Rating, or where acceptable, UL listed Integrated Equipment Short Circuit Rating.
 4. Circuit breaker enumeration (frame, ATE, poles, I.C.).
 - a. Indicate if circuit breakers are suitable for the panelboards' Fully Rated Equipment Rating, or where acceptable, are series connected devices which have been test verified and listed with UL (include documentation proving the compatibility of the proposed circuit breaker combinations). Circuit breakers do not have to be listed as series connected devices when all of the circuit breaker interrupting ratings are equal to, or greater than, the short circuit rating of the panelboard.
 5. When indicated on the panelboard schedule, a coordinated selective scheme between the main circuit breaker and branch/feeder circuit breakers so that under fault conditions the branch/feeder circuit breaker clears the fault while the main circuit breaker remains closed.
 6. Accessories.
- C. Product Data:
1. Catalog sheets, specifications and installation instructions.
 2. Bill of materials.
- D. Quality Control Submittals:
1. List of Completed Installations: If brand names other than those specified are proposed for use, furnish the name, address, and telephone number of at least 5 comparable installations which can prove the proposed products have operated satisfactorily for one year.
 2. Company Field Advisor Data: Include:
 - a. Name, business address and telephone number of Company Field Advisor secured for the required services.
 - b. Certified statement from the Company listing the qualifications of the Company Field Advisor.
 - c. Services and each product for which authorization is given by the Company listed specifically for this project.

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PANELBOARDS

- E. Contract Closeout Submittals:
1. System acceptance test report.
 2. Certificate: Affidavit, signed by the Company Field Advisor.
 3. Operation and Maintenance Data: Deliver 2 copies, covering the installed products, to the Owner's Representative.

1.03 QUALITY ASSURANCE

- A. Company Field Advisor: Secure the services of a Company Field Advisor from the manufacturer of the programmable solid state circuit breakers for a minimum of 8 working hours for the following:
1. Render advice regarding final adjustment and programming of the circuit breakers.
 2. Witness final system test and then certify with an affidavit that the circuit breakers are installed in accordance with the contract documents and are operating properly.
 3. Train facility personnel on the operation and maintenance of the circuit breakers (minimum of two 1 hour sessions).
 4. Explain available service programs to facility supervisory personnel for their consideration.

PART 2 PRODUCTS

2.01 PANELBOARDS

- A. As produced by Cutler-Hammer/Eaton Corp., Challenger Electrical Equipment Corp. General Electric Co., Siemens, or Square D Co., having:
1. Flush or surface type cabinets as indicated on the drawings.
 2. Increased gutter space for gutter taps, sub-feed wiring, through-feed wiring, oversize lugs.
 3. UL label "SUITABLE FOR USE AS SERVICE EQUIPMENT" where used as service equipment.
 - a. Where indicated, equip panelboards used as service equipment with secondary surge arresters; GE's Tranquell Series, Joslyn's Mfr. Co.'s Surge Tec Series, Intermatic Incorp.'s AG2401 or AG6503, Square D Co.'s SDSA 1175 or SDSA 3650, to suit system primary (transformer size, available current) and secondary characteristics.
 4. Door and one piece trim. Door fastened to trim with butt or piano hinges. Trim fastened to cabinet with devices having provision for trim adjustment.
 5. Door lock. 2 keys with each lock (Exception: Not more than 7 keys, total).
 6. Solid tinned copper bus bars. Ampere rating of bus bars not less than frame size of main circuit breaker.
 7. Full capacity copper neutral bus in panelboards where neutrals are required.
 8. Copper equipment grounding bus in panelboards where equipment grounding conductors are required.
 9. Sections designated "space" or "provision for future breaker" equipped to accept future circuit breakers.
 10. Lock on devices for exit light, fire alarm, stair well circuits.
 11. Provisions for padlocking circuit breaker handle in OFF position where indicated.

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PANELBOARDS

12. Directory.
13. Short circuit rating not less than indicated on panelboard schedule. Furnish panelboards having Fully Rated Equipment Rating (the short circuit rating of the panelboard is equal to the lowest interrupting rating of any device installed in the panelboard). Exception:
14. Molded case, bolt-on circuit breakers:
 - a. Mounting: Individually mounted main circuit breaker (when MCB is required), and group mounted branch/feeder circuit breakers to accommodate the circuit breaker style and panelboard construction.
 - b. Components: See panelboard schedule for specific components required for each circuit breaker. In addition to the specific components, equip each circuit breaker with additional components as required to achieve a coordinated selective scheme between the main circuit breaker and the branch/feeder circuit breakers when indicated on the panelboard schedule that a coordinated selective scheme is required.
 - c. Single pole 15 ATE and 20 ATE circuit breakers marked SWD where used as switches.
 - d. Single pole and two pole 15, 20, and 30 ATE circuit breakers rated for high intensity discharge lighting loads when applicable.

2.02 NAMEPLATES

- A. General: Precision engrave letters and numbers with uniform margins, character size minimum 3/16 inch high.
 1. Phenolic: Two color laminated engravers stock, 1/16 inch minimum thickness, machine engraved to expose inner core color (black lettering on a white background).
 2. Materials for Outdoor Applications: As recommended by nameplate manufacturer to suit environmental conditions.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install panelboards in accordance with NEMA Publication No. PB1.1 "General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less".
 1. Set/program the circuit breakers.
- B. Flush Cabinets: Set flush cabinets so that edges will be flush with the finished wall line. Where space will not permit flush type cabinets to be set entirely in the wall, set cabinet as nearly flush as possible, and cover the protruding sides with the trim extending over the exposed sides of the cabinet and back to the finished wall line.
- C. Directory: Indicate on typewritten directory the equipment controlled by each circuit breaker, and size of feeder servicing panelboard. For power panelboards also include ATE rating and feeder size for each breaker.

SECTION 16442
PANELBOARDS

D. Identification:

1. Provide nameplates corresponding to panelboard designations on the drawings, and electrical parameters (phase, wire, voltage).
2. Install a nameplate on each panelboard which explains the means of identifying each ungrounded system conductor by phase and system. Examples of nameplate statements:
 - a. Identification of 120/208 Volt Circuit Conductors:
2 wire circuit - white*, black.
3 wire circuit - white*, black, red.
4 wire circuit - white*, black, red, blue.

*White is used only as neutral. Where neutral is not required, black, red, or black, red, blue is used for phase to phase circuits.

- b. Identification of 277/480 Volt Circuit Conductors:
2 wire circuit - natural gray**, brown.
3 wire circuit - natural gray**, brown, yellow.
4 wire circuit - natural gray**, brown, yellow, orange.

**Natural gray is used only as neutral. Where neutral is not required, brown, yellow, or brown, yellow, orange is used for phase to phase circuits.

3.02 FIELD QUALITY CONTROL

A. Preliminary System Test:

1. Preparation: Have the Company Field Advisor adjust the completed circuit breakers and then operate them long enough to assure that they are performing properly.
2. Run a preliminary test for the purpose of:
 - a. Determining whether the circuit breakers are in a suitable condition to conduct an acceptance test.
 - b. Checking instruments and equipment.
 - c. Training facility personnel.

B. System Acceptance Test:

1. Preparation: Notify the Owner's Representative at least 3 working days prior to the test so arrangements can be made prior to the test to have a Facility Representative witness the test.
2. Make the following tests:
 - a. Test circuit breakers which have ground fault protection in accordance with the approved information sheets and test form.
 - b. Test programmable solid state trip devices in accordance with the manufacturer's recommendations.
3. Supply all equipment necessary for system adjustment and testing.
4. Submit written report of test results signed by the Company Field Advisor and the Owner's Representative. Mount a copy of the final report in a conspicuous location on, or inside, the panelboard door.

SECTION 16442
PANELBOARDS

END OF SECTION

SECTION 16510
FIRE ALARM SYSTEM

PART 1 GENERAL

1.01 SUMMARY

- Section includes the equipment for a complete fire alarm system. This shall include heat sensors, smoke detectors, strobe lights, and fire alarm control panels. This section will also include the monitor system and modules necessary to complete the system.
 - The fire alarm system supplier shall also be the integrator and installer of the system.
 - The integrator of the fire alarm system shall furnish and install of the wiring for all of the devices included in the fire alarm system.
 - The fire alarm system shall have outputs at each building to the SCADA system for alarm.
- A. Related Sections: Section(s) related to this section include:
1. Wiring, General – 600 Volts and Under: Section 16121.

1.02 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide heat sensors, smoke detector, horns, strobes, control panels, radio equipment, pull stations, etc. that have been manufactured, assembled, and installed to maintain performance criteria stated by manufacturer without defects, damage, or failure.
- B. Performance Testing Requirements
1. Manufacturer shall test 100% of equipment prior to shipment. Sample testing is not acceptable.
- C. Code Requirements
1. All sensor and power packs shall be UL listed.
 2. All sensors shall be FCC compliant where applicable.
 3. Building Codes: All units shall comply with applicable, local building codes.

1.03 SUBMITTALS

- A. Bill of Materials: Complete list of all parts needed to fully install selected occupancy sensor light control systems.
- B. Product Data: Submit product data, including catalog cut sheets for specified products.
- C. Shop and Wiring Drawings: Submit shop drawings detailing all mechanical and electrical equipment including wire counts, and physical dimensions of each item.
- D. Installation and Maintenance Instructions: Submit manufacturer's installation and maintenance instructions.

SECTION 16510
FIRE ALARM SYSTEM

- E. Closeout Submittals: Warranty documents specified herein.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Installer shall be one who is experienced in performing the work of this section, and who has specialized in installation of work similar to that required for this project.
- B. Source Limitations: To assure compatibility, obtain sensors from a single source with complete responsibility over all products. The use of subcontracted component assemblers is not acceptable.
- C. Manufacturer Requirements: The manufacturer will be one who has been continuously engaged in the manufacture of fire alarm equipment no less than 10 years.

1.05 DELIVERY, STORAGE & HANDLING

- A. Ordering: Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.
- B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged packages with intact identification labels.
- C. Storage and Protection: Store materials away from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.

1.06 WARRANTY

- A. Manufacturer's Warranty: All equipment shall be warranted free of defects in materials and workmanship.
 - 1. Warranty Period: Five years from date of purchase.
 - 2. Owner Rights: Manufacturer's warranty is in addition to, not a limitation of, other rights the Owner may have under contract documents.

PART 2 PRODUCTS

2.01 FIRE ALARM SYSTEM

The fire alarm and security system architecture as shown on the contract drawings and the equipment specified herein shall be supplied by the electrical contractor.

- A. Fire Alarm Control Panel
 - 1. Shall include a 25 point addressable capability.
 - 2. Shall have an SLC loop.
 - 3. Shall include a 80 character LCD display.

SECTION 16510
FIRE ALARM SYSTEM

4. Shall be 120V powered.
 5. The Fire Alarm Control Panel shall be Fire-Lite MS-25 or engineer approved equal.
- B. Smoke Detectors
1. Shall be addressable.
 2. Shall be photoelectric.
 3. Smoke detectors shall have an insect screen that is easily cleanable.
 4. Smoke Detectors shall be Fire-Lite SD355 or engineer approved equal.
- C. Thermal Detectors
1. Shall be addressable.
 2. Shall use thermistor sensing circuit.
 3. The Thermal Detectors shall be Fire-Lite H355R(A) for alarm detection at 135degF and H355HT(A) for activation at 195degF or engineer approved equal.
- D. Strobes, Horns, & Horn/Strobes
1. Shall be addressable.
 2. The Strobes and Horns shall be Fire-Lite SpectrAlert or engineer approved equal.
- E. Explosion Proof Smoke Detectors
1. Shall be Fire-Lite Pyrotector Model 30-3003 or equal.
 2. Shall be addressable.
- F. Exterior Siren Strobe
1. Shall be rated for exterior use.
 2. Shall have a single tone piezo siren – warble.
 3. Strobe shall flash at same rate as siren sounding.
 4. Shall mount on single gang box.
 5. Siren shall be a 105db tone.
 6. Shall be Honeywell or approved equal.

PART 3 EXECUTION

3.01 PREPARATION

- A. Site Verification: Verify that conditions are acceptable for product installation in accordance with manufacturer's instructions.
- B. Inspection: Inspect all material included in this contract prior to installation. Manufacturer shall be notified of unacceptable material prior to installation.

3.02 INSTALLATION

- A. The Contractor, as part of the work of this section, shall coordinate, receive, mount, connect, and place into operation all equipment. The Contractor shall furnish all conduit, wire, connectors, hardware, and other incidental items necessary for properly functioning fire alarm and security system as described herein and shown on the plans. The

SECTION 16510
FIRE ALARM SYSTEM

Contractor shall maintain performance criteria stated by manufacturer without defects, damage, or failure.

1. Compliance: Contractor shall comply with manufacturer's product data, including shop drawings, technical bulletins, product catalog installation instructions, and product carton instructions for installation.
- B. Power: The contractor shall test that all branch load circuits are operational before connecting loads to sensor system load terminals, and then de-energize all circuits before installation.
- C. Related Product Installation: Refer to other sections listed in Related Sections for related products' installation.

3.03 TESTING

- A. Upon completion of all line, load and interconnection wiring, and after all equipment is installed, a qualified factory representative shall completely check the installation prior to energizing the system. Each installed sensor shall be tested in the test mode to see that the device works.
- B. At the time of checkout and testing, the owner's representative shall be thoroughly instructed in the proper operation of the system.
- C. At the final inspection, a minimum NICET Level II technician shall demonstrate that the system functions properly in every respect.
- D. Instruction shall be provided as required for operating the system. Hands-on demonstrations of the operation of all system components and the entire system including program changes and functions shall be provided.

3.04 PROTECTION

- A. Contractor shall protect installed product and finished surfaces from damage during all phases of installation including preparation, testing, and cleanup.

END OF SECTION

SECTION 16512
LIGHT-EMITTING DIODE (LED) FIXTURES

PART 1 GENERAL

1.01 SUBMITTALS

- A. Product Data: Catalog sheets, specifications and installation instructions, including:
 - 1. Technical information for each fixture that proves that it meets specified requirements. Include data which proves proposed lamp and ballast combinations do not exceed specified total harmonic distortion.
 - 2. Candlepower distribution curves for each type fixture if different from Company or catalog number specified.
- B. Samples: One of each product if requested.
- C. Quality Control Submittals:
 - 1. List of Installations for Electronic Ballasts: If brand names other than those specified are proposed for use, furnish the name, address, and telephone number of at least 5 comparable installations which can prove the proposed products have operated satisfactorily for 1 year. The installations shall present a grand total of at least 5000 ballasts.

1.02 QUALITY ASSURANCE

- A. Equipment Qualifications For Products Other Than Those Specified:
 - 1. At the time of submission provide written notice to the Owner's Representative of the intent to propose and "or equal" for products other than those specified. Make the "or equal" submission in a timely manner to allow the Owner's Representative sufficient time to review the proposed product, perform inspections and witness test demonstrations.
 - 2. If products other than those specified are proposed for use furnish the name, address, and telephone numbers of at least 5 comparable installations that can prove the proposed products have performed satisfactorily for 3 years. Certify in writing that the owners of the 5 comparable installations will allow inspection of their installation by the Owner's Representative and the Company Field Advisor.
 - a. Make arrangements with the owners of 2 installations (selected by the Owner's Representative) for inspection of the installations by the Owner's Representative. Also obtain the services of the Company Field Advisor for the proposed products to be present. Notify the Owner's Representative a minimum of 3 weeks prior to the availability of the installations for the inspection, and provide at least one alternative date for each inspection.
 - b. Only references from the actual owner or owner's representative (Security Supervisor, Maintenance Supervisor, etc.) will be accepted.

SECTION 16512
LIGHT-EMITTING DIODE (LED) FIXTURES

References from dealers, system installers or others, who are not the actual owners of the proposed products, are not acceptable.

- 1) Verify the accuracy of all references submitted prior to submission and certify in writing that the accuracy of the information has been confirmed.
3. The product manufacturer shall have test facilities available that can demonstrate that the proposed products meet the contract requirements.
 - a. Make arrangements with the test facility for the Owner's Representative to witness test demonstrations. Also obtain the services of the Company Field Advisor for the proposed product to be present at the test facility. Notify the Owner's Representative a minimum of 3 weeks prior to the availability of the test facility, and provide at least one alternative date for the testing.
4. Provide written certification from the manufacturer that the proposed products are compatible for use with all other equipment proposed for use for this system and meet all contract requirements ..

PART 2 PRODUCTS

2.01 LUMINAIRES

- A. Type Vaportite LED: Full metal fixture liner inside reinforced fiberglass housing; Cooper Metalux Vaportite LED Series:
 1. Lamp Type: Solid State.
 2. Fixture Length: 4'
 3. Luminaire to operate at 120 - 277V and connected for operation on 120V circuit, unless otherwise indicated on drawing.
 4. Mounting:
 - a. Pendant.
 5. Housing:
 - a. Fiberglass.
 6. Fixture is suitable for operation from -20 degrees C to 25 degrees c ambient conditions.
 7. Wet location Listed.
 8. IP56
 9. LED lamp listed UL 8750
 10. 5 year warranty.
- B. Type Explosion Proof LED Area Light: Rugged, aluminum housing. Borosilicate glass lenses. Stainless Steel hardware, one piece silicone gasket; Rigalite SXPJ Series:
 1. Lamp Type: Solid State.
 2. Luminaire to operate at 120 - 277V and connected for operation on 120V circuit, unless otherwise indicated on drawing.
 3. Class 1 Div1
 4. Mounting:
 - a. Ceiling mounted.
 5. Housing:
 - a. Rugged, A360 aluminum with baked-on gray epoxy finish.
 6. Diffuser: Borosilicate glass lenses.
 7. Fixture is suitable for operation from -40 degrees C to 40 degrees c ambient conditions.
 8. Wet location Listed.

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9. IP66
 10. LED lamp listed UL 8750
- C. Type LED Wall Pack: Rugged, die-cast, aluminum housing. all polycarbonate one piece vandal resistant door, 30 high-power LEDs; Hubbell Outdoor Lighting Perimaliter LED Wallpack PVL3 Series:
1. Lamp Type: Solid State.
 2. Luminaire to operate at 120V circuit, unless otherwise indicated on drawing.
 3. Photoelectric cell
 4. Mounting:
 - a. Wall mounted.
 5. Housing:
 - a. Rugged, die-cast, single piece aluminum.
 6. Diffuser: Symmetric LED lens.
 7. Fixture is suitable for operation from -40 degrees C to 40 degrees c ambient conditions.
 8. Wet location Listed.
 9. IP65
 10. LED lamp listed UL 8750
- 2.02 FUSE HOLDERS AND FUSES

- A. Enclosed waterproof in-line fuse holders rated 600 volts; Bussmann Div. Cooper Industries TRON waterproof fuseholder Symbol HEB with Buss Symbol KTK fuses, or Gould Shawmut's GEB Series with ATM fuses.

PART 3 EXECUTION

3.01 INSTALLATION

- A. General: Install fixtures at locations indicated on the drawings.
- B. Finishing Collar or Combination Finishing Collar/Outlet Box (Surface Mounted Fixture Used With Exposed Raceway):
 1. Provide finishing collar where surface mounted fixture is installed on an exposed raceway outlet box and the fixture base is larger than the outlet box.
 2. Provide combination finishing collar/outlet box where surface mounted fixture is not indicated to be installed on an exposed raceway outlet box, but raceway cannot be run directly into fixture body due to fixture design.

END OF SECTION