ERIE COUNTY WATER AUTHORITY

INTEROFFICE MEMORANDUM

April 13, 2022

To: Terrence D. McCracken, Secretary to the Authority

From: Michael J. Quinn, Senior Distribution Engineer

Subject: Contract NC-043
New Pump Station at the Newstead Water Storage Tank
ECWA Project No. 202100048

The following documents are attached:

- Blue Authorization Form – this form provides the project name and project number, the action that is being requested of the Board (resolution to advertise for bids) and a list of approvals that are required prior to being acted on by the Board.
- One Project Manual.

The above referenced project was designed by Nussbaumer & Clarke, Inc. (NC)

The Newstead Water Storage Tank is an elevated composite 1.5 million gallon tank constructed in 2006 in ECWA Pressure Zone 14, which is pressurized by two pump stations: Harris Hill and Broadway. Due to increase in demand in that pressure zone and aging infrastructure, the tank can no longer fill sufficiently simply by increasing the discharge pressure from the two pump stations. Doing so may cause significant line breaks. Contract NC-043 consists of construction of a new pump station within the base of the existing Newstead Water Storage Tank site to enable the Authority to fill the tank to proper level.

The Engineering Department is requesting the Board Resolution to Advertise the above referenced contract.

Budget Information:
Unit: 2520 Eng/Const Control
Item 101589 Newstead PS Improvements

- 2022 Budget – Engineering Services and Construction

MJQ:jmf
Attachments
cc: R.Stoll
L.Kowalski
W.Wheeler
L.Lester
CONT-NC-043-2101-X-012

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ERIE COUNTY WATER AUTHORITY
AUTHORIZATION FORM
For Approval/Execution of Documents
(check which apply)

Contract: NC-043 **Project No.:** 202100048
Project Description: New Pump Station at the Newstead Water Storage Tank.

Item Description:

- [ ] Agreement
- [ ] Professional Service Contract
- [ ] Amendment
- [ ] Change Order
- [ ] BCD
- [ ] NYSDOT Agreement
- [X] Contract Documents
- [ ] Addendum
- [ ] Recommendation for Award of Contract
- [ ] Recommendation to Reject Bids
- [ ] Request for Proposals
- [ ] Other

Action Requested:

- [ ] Board Authorization to Execute
- [X] Legal Approval
- [ ] Board Authorization to Award
- [ ] Execution by the Chairman
- [X] Board Authorization to Advertise for Bids
- [ ] Execution by the Secretary to the Authority
- [ ] Board Authorization to Solicit Request for Proposals
- [ ] Other

Approvals Needed:

APPROVED AS TO CONTENT:

- [X] Sr. Distribution Engineer — Date: 4/13/2022
- [X] Chief Operating Officer — Date: 4/13/2022
- [X] Executive Engineer — Date: 04/14/2022
- [X] Director of Administration — Date: 04/13/2022
- [X] Risk Manager — Date: 04/14/2022
- [X] Chief Financial Officer — Date: 04/13/2022
- [X] Legal — Date: 4/13/2022

APPROVED FOR BOARD RESOLUTION:

- [X] Secretary to the Authority — Date: 04/18/22

Remarks:

Resolution Date: **Item No:**

Set No: _____

Project Manual

For Authorization to Advertise

Contract No.: NC-043
New Pump Station at the
Newstead Water Storage Tank

Project No. 202100048

March 2022

Erie County Water Authority

3030 Union Road
Cheektowaga, New York 14227

ERIE COUNTY WATER AUTHORITY
BUFFALO, NEW YORK

CONTRACT NO: NC-043
NEW PUMP STATION AT THE NEWSTEAD WATER STORAGE TANK

ECWA PROJECT NO: 202100048

MARCH 2022

This Project Manual and Contract Drawings were prepared under the direct supervision of a Professional Engineer by: Nussbaumer & Clarke, Inc.

(PE Seal)

ERIE COUNTY WATER AUTHORITY
3030 Union Road
Cheektowaga, New York 14227

ERIE COUNTY WATER AUTHORITY
BUFFALO, NEW YORK

CONTRACT NO: NC-043
NEW PUMP STATION AT THE NEWSTEAD WATER STORAGE TANK
PROJECT NO: 202100048

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9	SD101	Structural Demolition Floor Plan
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ERIE COUNTY WATER AUTHORITY
3030 UNION ROAD
CHEEKTOWAGA, NEW YORK 14227

CONTRACT NO: NC-043
NEW PUMP STATION AT THE NEWSTEAD WATER STORAGE TANK
PROJECT NO: 202100048

NOTICE TO BIDDERS

The Erie County Water Authority will receive separate, sealed bids for the furnishing of all labor, plant, tools, equipment and specified materials or services for the ERIE COUNTY WATER AUTHORITY, New Pump Station at the Newstead Water Storage Tank, TOWN OF NEWSTEAD. The Work consists of a single contract for the installation of a duplex pump station, emergency generator, and appurtenances.

Bids must be received by the Erie County Water Authority no later than (Time) a.m. Eastern Prevailing Time, on (Day of week, Date) at the Service Center Front Desk, Erie County Water Authority, 3030 Union Road, Cheektowaga, New York 14227.

When permitted, members of the public may be present to observe the bid opening. All attendees must bring a government-issued photo identification (driver's license preferred) and check-in with the ECWA receptionist before being allowed entry to the bid opening.

Whenever the Erie County Water Authority is operating under a Declaration of Emergency due to a pandemic or other general state of emergencies, members of the public may be precluded from being present at such bid opening.

ANYONE ENTERING THE SERVICE CENTER OR OTHER AUTHORITY FACILITIES IS SUBJECT TO SUCH RESTRICTIONS OR LIMITATIONS IN PLACE AT THE TIME OF ENTRY.

All bids being mailed (including FedEx, UPS, Priority Mail, etc.) or delivered shall be directed to the "SERVICE CENTER FRONT DESK" at the address listed above in a sealed envelope and be clearly marked on the outside of the mailing or hand-delivered envelope "BID ENCLOSED – ECWA New Pump Station at the Newstead Water Storage Tank, Town of Newstead".

Beginning at 9:00 a.m. Eastern Prevailing Time, on (Day of week, Date), if bidders wish to purchase printed copies of the Contract Documents, they must be obtained through Avalon. The fee paid to Avalon is non-refundable. **Only official planholders will be allowed to bid on the project.** Bidders acknowledge that they are responsible for review of all components of the Contract Documents, including all specification sections and drawings, regardless of how many drawings they print and in which format/size they are printed.

The Contract Documents may be examined at the following locations:

Avalon Plan Room
www.avalonplanroom.com

Construction Exchange of Buffalo and WNY
2660 William Street
Cheektowaga, New York 14227

The Contract Document may be viewed online and ordered through Avalon Plan Room at: www.avalonplanroom.com in the "Public Bid" section. If you do not have internet access or have questions on ordering, please contact Avalon Document Services at 716-998-7777.

A pre-bid meeting will be held at (Time), Eastern Prevailing Time, on (Day of week, Date), at the Newstead Tank Site, Main Street and Crittenden Road, Town of Newstead. Attendance at the pre-bid meeting is recommended but is not mandatory.

Each bid shall be accompanied by a certified check or bid bond in the amount of five percent (5%) of the amount of the bid.

In accordance with State Finance Law §§139-j and 139-k, all questions about meaning or intent of the bidding documents shall be submitted to the designated contact person in writing. The designated contact is Darrell Jamieson, Nussbaumer & Clarke, 3556 Lake Shore Road, Suite 500, Buffalo, New York 14219, telephone (716) 827-8000 ext. 228, email djamieson@nussclarke.com.

The Erie County Water Authority reserves the right to reject any and all bids or to accept any bid deemed to be for the best interest of the Water Authority even though the proposal chosen may result in the award of the contract to a bidder whose bid is not mathematically lowest.

ERIE COUNTY WATER AUTHORITY

TERRENCE D. McCRACKEN
Secretary to the Authority

Engineer:
Mark DiPasquale, P.E.
Nussbaumer & Clarke, Inc.
3556 Lake Shore Road, Suite 500
Buffalo, NY 14219
716-827-8000 ext. 205 – phone
716-826-7958 – fax

Construction Administrator:
Darrell Jamieson
Nussbaumer & Clarke, Inc.
3556 Lake Shore Road, Suite 500
Buffalo, NY 14219
716-827-8000 ext. 228
716-826-7958 – fax

ERIE COUNTY WATER AUTHORITY
BUFFALO, NEW YORK

CONTRACT NO.: NC-043
NEW PUMP STATION AT THE NEWSTEAD WATER STORAGE TANK
PROJECT NO.: 202100048

SECTION 00200

INSTRUCTIONS TO BIDDERS

TABLE OF ARTICLES

ARTICLE 1 - DEFINED TERMS

1.01 Terms used in these Instructions to Bidders will have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below which are applicable to both the singular and plural thereof.

1.02 Additional terms used in these Instructions to Bidders have the meanings indicated below which are applicable to both the singular and plural thereof.

A. Bidder: The individual or entity who submits a Bid directly to OWNER.

B. Issuing Office: The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.

C. Successful Bidder: The Bidder submitting a responsive Bid to whom OWNER (on the basis of OWNER'S evaluation as hereinafter provided) makes an award. Also known as CONTRACTOR.

D. ENGINEER: As defined in the Agreement, Section 00500, under Article 2.

ARTICLE 2 - BIDS RECEIVED

2.01 Refer to Notice to Bidders for information on receipt of Bids.

ARTICLE 3 - LOCATION AND SCOPE OF WORK

3.01 Refer to Section 011000 of the General Requirements for the location and scope of the Work.

ARTICLE 4 - COPIES OF BIDDING DOCUMENTS

4.01 Refer to Notice to Bidders for information on examination and procurement of Bidding Documents.

4.02 The Issuing Office is the Service Center Front Desk of the Erie County Water Authority, 3030 Union Road, Cheektowaga, New York 14227.

4.03 Complete sets of Bidding Documents must be used in preparing Bids; neither OWNER, nor ENGINEER assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

4.04 OWNER and ENGINEER in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant permission for any other use.

ARTICLE 5 - QUALIFICATIONS OF BIDDERS

5.01 Bidders shall be experienced in the kind of Work to be performed, shall have the necessary equipment therefore, and shall possess sufficient capital to properly execute the Work within the time allowed. Bids received from Bidders who have previously failed to complete work within the time required, or who have previously performed similar work in an unsatisfactory manner, may be rejected. A Bid may be rejected if Bidder cannot show that Bidder has the necessary ability, plant and equipment to commence the Work at the time prescribed and thereafter to prosecute and complete the Work at the rate or within the time specified. A Bid may be rejected if Bidder is already obligated for the performance of other work which would delay the commencement, prosecution or completion of the Work.

5.02 To demonstrate qualifications to perform the Work, Bidder shall complete and submit with its Bid the Bidder Qualifications Statement which is bound in the Project Manual. Bidders may be asked to furnish additional data to demonstrate their qualifications.

5.03 Bidders shall be qualified to do business in the state where the Project is located or covenant to obtain such qualification prior to signing the Agreement.

ARTICLE 6 - EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

6.01 Subsurface and Physical Conditions

A. The Supplementary Conditions identify:
   1. Those reports of explorations and tests of subsurface conditions at or contiguous to the Site which have been utilized by ENGINEER in preparation of the Bidding Documents.
   2. Those drawings of physical conditions in or relating to existing surface and subsurface structures (except underground facilities) which are at or contiguous to the Site that have been utilized by ENGINEER in preparation of the Bidding Documents.

B. Copies of the reports and drawings referenced in the Supplementary Conditions will be made available by ENGINEER 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 paragraph 4.02 of the General Conditions has been identified and established in paragraph SC-4.02 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion drawn from any "technical data" or any other data, interpretations,

opinions or information contained in such reports or shown or indicated in such drawings.

6.02 Underground Facilities - Physical Conditions

A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to OWNER and ENGINEER by owners of such Underground Facilities, including OWNER, or others.

6.03 Hazardous Environmental Condition

A. OWNER has no actual knowledge of a hazardous environmental condition at the Site.

6.04 Provisions concerning responsibilities for the adequacy of data, if any, furnished to prospective Bidders with respect to subsurface conditions, other physical conditions and Underground Facilities, and possible changes in the Bidding Documents due to differing or unforeseen conditions appear in paragraphs 4.02, 4.03 and 4.04 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Bidding Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the Scope of Work appear in paragraph 4.06 of the General Conditions.

6.05 On request, OWNER will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests and studies as each Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the Site to its former conditions upon completion of such explorations, investigations, tests and studies.

6.06 On request, OWNER will conduct a Site visit during OWNER'S normal business hours.

6.07 Reference is made to the Supplementary Conditions for identification of the general nature of other work that is to be performed at the Site by OWNER or others (such as utilities and other prime contractors) that relates to the Work for which a Bid is to be submitted. On request, and if available, OWNER will provide to Bidder, for examination, access to or copies of the contract documents for such other work.

6.08 It is the responsibility of Bidder, before submitting a Bid to:

A. Examine and carefully study the Bidding Documents, including any Addenda and the other related data identified in the Bidding Documents;

B. Visit the Site and become familiar with and satisfy Bidder as to the general, local and Site conditions that may affect cost, progress and performance of the Work;

C. Become familiar with and satisfy Bidder as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work;

D. Carefully study all reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in paragraph 4.02 of the General Conditions, and to carefully study all reports and drawings of a Hazardous Environmental Condition identified at the Site, if any, which have been identified in the Supplementary Conditions as provided in paragraph 4.06 of the General Conditions;

E. Obtain and carefully study (or assume responsibility for having done so) all examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by Bidder, including any specific means, methods, techniques, sequences and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto;

F. Agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for the performance of the Work at the price bid and within the times and in accordance with the other terms and conditions of the Bidding Documents;

G. Become aware of the general nature of work (if any) to be performed by OWNER and others at the Site that relates to the Work as indicated in the Bidding Documents;

H. Correlate the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies and data with the Bidding Documents;

I. Promptly give ENGINEER written notice of all conflicts, errors, ambiguities or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by ENGINEER is acceptable to Bidder; and

J. Determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

6.09 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 6, that without exception the Bid is premised upon performing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences or procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given ENGINEER written notice of all conflicts, errors, ambiguities and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by ENGINEER are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing the Work.

ARTICLE 7 - PRE-BID CONFERENCE

7.01 A pre-bid conference will be held if so indicated in the Notice to Bidders, and will be as follows. Representatives of the OWNER and ENGINEER will be present to discuss the Project. Bidders are encouraged to attend and participate at the conference. ENGINEER will transmit to all prospective Bidders of record such Addenda as ENGINEER considers necessary in response to questions raised at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

ARTICLE 8 - SITE AND OTHER AREAS

8.01 The Site is identified in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment, to be incorporated into the Work are to be obtained and paid for by CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by OWNER unless otherwise provided in the Bidding Documents.

ARTICLE 9 - INTERPRETATIONS AND ADDENDA

9.01 All questions about the meaning or intent of the Bidding Documents shall be submitted to ENGINEER in writing. In order to receive consideration, questions must be received by ENGINEER at least ten (10) days prior to the date for the opening of Bids. Interpretations, clarifications, and/or supplemental instructions considered necessary by ENGINEER in response to such questions will be issued by Addenda to all parties recorded by ENGINEER as having received the Bidding Documents. Such Addenda will be issued: (1) by mail, either Registered or Certified, with return receipt requested, (2) by email, or (3) through an online bid distribution platform. Such Addenda will be issued for receipt not later than three (3) days prior to the date for the opening of Bids. Failure of any Bidder to receive such Addendum or interpretation shall not relieve any bidder from any obligation under his bid submitted. All Addenda so issued shall become part of

the Contract Documents. All Addenda must be submitted with the bid proposal and be properly signed by the Bidder as part of the Bid Documents. Only questions answered by Addenda will be binding. The OWNER will not be responsible for any other explanations or interpretation of such documents which anyone presumes to make on behalf of the OWNER before expiration of the time set for the receipt of Bids. No interpretation of the meaning of the plans, specifications or other Contract Documents will be made to any bidder orally. Oral and other interpretations or clarifications will be without legal effect.

9.02 Addenda may also be issued to clarify, correct or change the Bidding Documents as deemed advisable by OWNER or ENGINEER. Such Addenda, if any, will be issued in the manner and within the time period stated in paragraph 9.01.

ARTICLE 10 - BID SECURITY

10.01 A Bid must be accompanied by Bid security made payable to the OWNER in the amount of five percent of Bidder's maximum Bid price and in the form of certified check or Bid Bond.

10.02 Bid Bond shall be on the form bound in the Project Manual. Bid Bond shall be issued by a surety meeting the requirements of paragraphs 5.01 and 5.02 of the General Conditions. The Bid Bond must contain original signatures in ink. Pencil, stamped, thermal faxed, Xeroxed, or any other copies of the signature shall be grounds for voiding the Bid.

10.03 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to sign and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, OWNER may annul the Notice of Award and the Bid security of that Bidder will be forfeited to the OWNER as liquidated damages for such failure.

10.04 The Bid security of the three lowest bidders may be retained by OWNER until the earlier of the seventh day after the Effective Date of the Agreement or the forty-first day after the Bid opening whereupon the Bid security furnished by such Bidders will be returned. The Bid security of Bidders whom OWNER believes do not have a reasonable chance of receiving an award will be returned within seven days of the Bid opening.

ARTICLE 11 - CONTRACT TIMES

11.01 The number of days within which the Work is to be substantially completed and also completed and ready for final payment (the Contract Times) are set forth in the Agreement.

ARTICLE 12 - LIQUIDATED AND SPECIAL DAMAGES

12.01 Provisions for liquidated and special damages, if any, are set forth in the Agreement.

ARTICLE 13 - SUBSTITUTE AND "OR EQUAL" ITEMS

13.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or-equal" items. Whenever it is specified or described in the Bidding Documents 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 the Agreement. The procedure for submittal of any such application by CONTRACTOR and consideration by ENGINEER is set forth in the General Conditions which may be supplemented in the General Requirements.

13.02 Refer to Section 01630 of the General Requirements for the period of time after the Effective Date of the Agreement during which the ENGINEER will accept applications for substitute or "or-equal" items of material or equipment.

ARTICLE 14 - SUBCONTRACTORS, SUPPLIERS, AND OTHERS

14.01 If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, individuals or entities to be submitted to OWNER in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening submit to OWNER a list of all such Subcontractors, Suppliers, other individuals or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualifications for each such Subcontractor, Supplier, individual or entity if requested by OWNER. If OWNER or ENGINEER, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual or entity, OWNER may, before the Notice of Award is given, request the apparent Successful Bidder to submit an acceptable substitute without an increase in Bid price.

14.02 If apparent Successful Bidder declines to make any such substitution, OWNER may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers and other individuals or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual or entity so listed and against which OWNER or ENGINEER makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to OWNER and ENGINEER subject to revocation of such acceptance after the Effective Date of the Agreement as provided in paragraph 6.06 of the General Conditions.

14.03 CONTRACTOR shall not be required to employ any Subcontractor, Supplier, individual or entity against whom CONTRACTOR has reasonable objection.

ARTICLE 15 - PREPARATION OF BID

15.01 A Bid must be made on the Bid form bound in the Project Manual. The Bid form shall not be separated from the Project Manual nor shall it be altered in any way.

15.02 All blanks in the Bid Form shall be completed by printing in black ink or by typewriter. A Bid price shall be indicated in both words and numbers for each Bid item listed therein or the words "No Bid", or "Not Applicable" entered. In case of discrepancy between the words and the numerals, the words shall govern. Ditto marks are not considered writing or printing and shall not be used.

15.03 A Bid shall be executed as stated below.

A. A Bid by an individual shall show the Bidder's name and official address.

B. A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title shall appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown below the signature.

C. A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid form. The official address of the joint venture shall be shown below the signature.

D. A Bid by a corporation shall be executed in the corporate name by an officer of the corporation and shall be accompanied by a certified copy of a resolution of the board of directors authorizing the person signing the Bid to do so on behalf of the corporation. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The state of incorporation and the official corporate address shall be shown below the signature.

E. A Bid by a limited liability company shall be executed in the name of the firm and signed by a member accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown below the signature.

F. All names shall be typed or printed in black ink below the signature.

G. Evidence of authority to conduct business as an out-of-state corporation in the state where the Work is to be performed shall be provided, if applicable.

15.04 The Bid shall contain an acknowledgment of the receipt of all Addenda in the space provided on the Bid form.

15.05 The address and telephone number for communications regarding the Bid shall be shown.

15.06 In addition to the Bid Form, the following listed documents, which are bound in the Project Manual in Section 00430 – Bid Form Supplements and Section 00450 – Bidders' Qualification Statement, shall be submitted with the Bid. Each document shall be executed in the manner described in paragraph 15.03 unless another manner is indicated.

A. Bid Security Form.

B. Section 2875 of the Public Authorities Law.

C. Section 2876 of the Public Authorities Law.

D. Section 2878 of the Public Authorities Law, Non-collusive Bidding Certification.

E. State Finance Law Requirements.

F. Statement Regarding Prevention of Unlawful Discriminatory Practices.

G. Bidder's Qualification Statement, including Attachments A, B, C and D and Bidder's "Experience in The Installation of Tapping Sleeves & Valves on Prestressed Concrete Cylinder Pipe", if applicable.

H. In accordance with the Supplementary Conditions Section SC-18.06, Erie County Water Authority Apprenticeship Policy, provide documentation for bidder and all subcontractors regarding a New York State Registered Apprenticeship program. This shall include a letter stating that each company is signatory with an active NYSDOL Sponsor and a copy of a current Apprenticeship Training Program registration agreement, AT-10 form.

I. In accordance with Appendix B, submit Certificate of Insurance verifying that the bidder's firm has insurance coverage meeting the requirements of Appendix B.

J. All Addenda

ARTICLE 16 - BASIS OF BIDS; COMPARISON OF BIDS

16.01 Lump Sum and Unit Price

A. Bidder shall submit its Bid on the basis of each lump sum item and unit price item as set forth in the Bid Form. For each unit price item on the Bid form, Bidder shall enter the unit price Bid, and shall enter the computation of the respective quantity times the Bidder's unit price for that item. Bidder shall compute and enter in the

space provided on the Bid form, the total of all lump sum items and the total of the products of quantity and unit price Bid for each unit price item.

B. For determination of the apparent low Bidder, Bids will be evaluated on the basis of the total of all lump sum items and the total of the products of the estimated quantity of each item and unit price Bid for that item.

C. The quantities for the unit price items are unpredictable and the ENGINEER has inserted certain quantities in the Bid Form to be used solely for purpose of comparison bids.

D. Fixed minimum unit prices may have been established for some of the items in the Bid. The prices represent the minimum amounts which will be paid the CONTRACTOR for these items. If in the opinion of the Bidder these prices do not reflect the actual value of the work involved the Bidder may void the given fixed minimum unit price for that specific item and enter a higher unit price in the spaces provided in the Bid Sheets.

16.02 Discrepancies between words and figures will be resolved in favor of words. Discrepancies between 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.

ARTICLE 17 - SUBMITTAL OF BID

17.01 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Notice to Bidders. The entire Project Manual must be submitted with all proper forms completed and signed as required.

17.02 Bid shall be enclosed in an opaque sealed envelope plainly marked on the outside with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted) the name and address of the Bidder and its license or registration number, if applicable. Bid shall be accompanied by Bid security and other required documents.

17.03 All bids being mailed (including FedEx, UPS, Priority Mail, etc.) or hand-delivered to the Erie County Water Authority shall follow the procedure as defined in Section 00100, Notice To Bidders.

ARTICLE 18 - MODIFICATION OR WITHDRAWAL OF BID

18.01 Withdrawal Prior to Bid Opening:

A. A Bid may be 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 prior to the date and time fixed for the opening of Bids. Upon receipt of such written notice, the unopened Bid will be returned to the Bidder.

18.02 Modification Prior to Bid Opening:

A. If a Bidder wishes to modify its Bid, Bidder must withdraw its initial Bid in the manner specified in paragraph 18.01.A and submit a new Bid.

18.03 No Bids may be withdrawn after the time set for the Bid Opening.

ARTICLE 19 - OPENING OF BIDS

19.01 Bids will be opened at the time and place where Bids are to be submitted and, unless obviously non-responsive, read aloud publicly. An abstract of the Bids will be made available to Bidders after the opening.

19.02 Bids received by mail or otherwise after the date and time specified for the opening of Bids will not be accepted and will be returned to the Bidder unopened.

19.03 Bid results are available on the Erie County Water Authority website, www.ecwa.org (under Doing Business tab, select option Business Opportunities). No bid results will be given over the telephone.

ARTICLE 20 - DISQUALIFICATION OF BIDDERS

20.01 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.

ARTICLE 21 - BIDS TO REMAIN SUBJECT TO ACCEPTANCE

21.01 All Bids shall remain subject to acceptance for forty five 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.

21.02 In the event that the OWNER requires more than 45 calendar days after the actual date of the Bid Opening to award the contract, Bidders shall, when requested, provide to ENGINEER a written extension of time for OWNER to award the contract. Bidders shall also provide, to ENGINEER, written Consent of Surety for extension of the bid bond.

21.03 In the event that the OWNER requires more than 45 calendar days after the actual date of the Bid Opening to award the contract, and the lowest qualified bidder does not grant an extension of time for the OWNER to award the contract, the OWNER reserves the right to award to the second lowest qualified bidder.

ARTICLE 22 - AWARD OF CONTRACT

22.01 OWNER reserves the right to reject any or all Bids, including without limitation the right to reject any or all nonconforming, non-responsive or conditional Bids. Bids may be rejected if they show any omissions, alterations of form, additions not called for, conditional or alternate bids other than are provided for in the Bid Form, bids containing escalation clauses or irregularities of any kind. OWNER further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to be non-responsible. OWNER also reserves the right to waive any informality not involving price, time or changes in the Work, if it is deemed to be in the best interest of the OWNER. The Bidder will not be allowed to take advantage of any error or omission.

22.02 OWNER reserves the right to reject any Bid not accompanied by specified documentation and Bid security. In the event that OWNER requires more than 45 calendar days after the actual Bid opening date to award the contract, Bidders shall provide to ENGINEER written Consent of Surety of the Bid Bond.

22.03 OWNER reserves the right to reject any Bid that, in its sole discretion, is considered to be unbalanced or unreasonable as to the amount bid for any lump sum or unit price item.

22.04 In evaluating Bidders, OWNER will consider their qualifications whether or not their Bids comply with the prescribed requirements, the alternatives, if any, the lump sum and unit prices, and other data as may be requested in the Bid Form or prior to the Notice of Award.

22.05 OWNER may consider the qualifications and experience of Subcontractors, Suppliers and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers and other individuals or entities must be submitted as provided in the Supplementary Conditions.

22.06 OWNER may conduct such investigations as OWNER deems necessary to establish the responsibility, qualifications and financial ability of the Bidders to perform the Work in accordance with the Contract Documents. OWNER reserves the right to reject the Bid of any Bidder who does not pass any such evaluation to OWNER'S satisfaction.

22.07 OWNER reserves the right to accept any Bid deemed to be in its best interests even though the Bid chosen may result in the award of the Contract to a Bidder whose Bid is not, on a mathematical basis alone, the low Bid.

22.08 The OWNER may elect not to award a contract at this time due to budgetary or other considerations. OWNER reserves the right to reject any or all proposals and to re-bid the contract if the OWNER deems it in the public interest to do so.

22.09 Contracts shall be awarded only pursuant to resolution.

22.10 OWNER reserves the right to reject any bids from Bidders who are in arrears to, or in litigation with, the Erie County Water Authority or the County of Erie upon any debt or contract, or in default as surety or otherwise upon any obligation of the Erie County Water Authority or the County of Erie.

ARTICLE 23 - CONTRACT SECURITIES

23.01 Performance Bond shall be in the form of Engineers Joint Contract Documents Committee (EJCDC) "Construction Performance Bond", 1910-28-A. Payment Bond shall be in the form of EJCDC "Construction Payment Bond", 1910-28-B. The amounts of and other requirements for Performance and Payment Bonds are stated in paragraph 5.01 of the General Conditions. The requirements for delivery of Bonds are stated in paragraph 2.01 of the General Conditions. Additional requirements may be stated in the Supplementary Conditions.

23.02 Successful Bidder shall within five days from the date of the Notice of Award deliver to OWNER, for OWNER'S review and approval, the Performance Bond and the Payment Bond CONTRACTOR proposes to furnish at the time of the execution of the Agreement.

ARTICLE 24 – CONTRACTOR'S INSURANCE

24.01 The requirements for CONTRACTOR'S insurance and delivery of insurance certificates are stated in Article 5 of the General Conditions and in the Supplementary Conditions.

ARTICLE 25 - SIGNING OF AGREEMENT

25.01 When OWNER gives a Notice of Award to the Successful Bidder, it will be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents, which are identified in the Agreement as attached thereto. Within five days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to OWNER.

ARTICLE 26 - NOTICE TO PROCEED

26.01 Issuance of the Notice to Proceed shall be as stated in Article 2 of the General Conditions.

ARTICLE 27 - PARTNERING (NOT USED)

ARTICLE 28 - SALES AND USE TAXES

28.01 Refer to Supplementary Conditions paragraph SC-6.10 for information on OWNER'S exemption from sales and use taxes on materials and equipment to be incorporated into the Work. Do not include said taxes in Bid.

ARTICLE 29 - ADDITIONAL REQUIREMENTS

29.01 Refer to Supplementary Conditions Paragraph SC-18.03 for information on OWNER'S Women and Minority Business Enterprise requirements.

29.02 Refer to Supplementary Conditions Paragraph SC-18.06 for information on OWNER'S Apprenticeship policy.

END OF SECTION

ERIE COUNTY WATER AUTHORITY
BUFFALO, NEW YORK

CONTRACT NO: NC-043
NEW PUMP STATION AT THE NEWSTEAD WATER STORAGE TANK
PROJECT NO: 202100048

SECTION 00360

PERMIT APPLICATIONS

ARTICLE 1 - GENERAL

1.01 CONTRACTOR shall apply for and is responsible for complying with all requirements of all applicable Federal, State, and Local Permits.

1.02 CONTRACTOR shall include all permit fees and permit requirements in his unit bid prices for the project and will not receive separate payment for any permit fees, including all associated permit conditions.

END OF SECTION

ERIE COUNTY WATER AUTHORITY
BUFFALO, NEW YORK

CONTRACT NO: NC-043
NEW PUMP STATION AT THE NEWSTEAD WATER STORAGE TANK
PROJECT NO: 202100048

(This Bid Form shall not be detached from the Project Manual. The entire Project Manual shall be returned with the executed Bid.)

SECTION 00410

BID FORMS

BID FOR:

Erie County Water Authority
Contract No: NC-043
NEW PUMP STATION AT THE NEWSTEAD WATER STORAGE TANK
Project No. 202100048

BID TO:

Service Center Front Desk
Erie County Water Authority
3030 Union Road
Cheektowaga, New York 14227

BID FROM: _____
(Print or Type Name of Bidder)
(/A Corporation/A Partnership/A Limited Liability Company/An Individual/A Joint Venture/[Bidder to strike out inapplicable terms.])

Gentlemen:

1.01 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with OWNER in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the price(s) and within the times indicated in this Bid and in accordance with the Bidding Documents.

2.01 Bidder accepts all of the terms and conditions of the Notice to Bidders and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain open subject to acceptance for the time period set forth in the Instruction to Bidders. Bidder will sign the Agreement and will furnish the required contract security, and other required documents within the time periods set forth in the Bidding Documents.

3.01 In submitting this Bid, Bidder represents, as set forth in the Agreement, that:

A. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, if any, and the following Addenda receipt of all of which is hereby acknowledged.

Addendum No.	Date Received	Addendum No.	Date Received
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance for the Work.

C. Bidder is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in paragraph 4.02 of the General Conditions, and (2) reports and drawings of a Hazardous Environmental Condition identified at the Site, if any, which have been identified in the Supplementary Conditions as provided in paragraph 4.06 of the General Conditions.

E. Bidder has obtained and carefully studied (or assumes responsibility for having done so) all examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may effect cost, progress or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by Bidder,

including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.

F. Bidder does not consider that any further examinations, investigations, explorations, tests, studies or data are necessary for the determination of this Bid for performance of the Work at the price(s) and within the times and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder 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 Bidding Documents.

H. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents and all additional examinations, investigations, explorations, tests, studies and data with the Bidding Documents.

I. Bidder has given ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by ENGINEER is acceptable to Bidder.

J. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

K. The quantities for the unit price items are unpredictable and the ENGINEER has inserted certain quantities in the proposal to be used solely for purpose of comparison of bids.

L. Fixed minimum unit prices may have been established for some of the items in the Bid. The prices represent the minimum amounts, which will be paid the CONTRACTOR for these items. The Bidder shall include a price not less than the stated minimum. If in the opinion of the Bidder these prices do not reflect the actual value of the work involved, the Bidder may void the given fixed minimum unit price for that specific item and enter a higher unit price in the spaces provided in the Bid Form sheets. Bidder's Proposals received which include a unit price less than the stated minimum shall be adjusted to meet the fixed minimum unit price.

4.01 Bidder further represents that this Bid is genuine and is not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any individual or entity to refrain from bidding; Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER; and that no person or persons acting in any official capacity for the OWNER are directly or indirectly interested in this Bid, or in any portion of the profit thereof.

5.01 Bidder will complete the Work in accordance with the Contract Documents for:

Description	Estimated Quantities	Computed Totals
Item 1 – New Pump Station		
Item 1A – Pump Station – For furnishing and installing a new pump station, appurtenances and electrical, mechanical, heating, ventilation, structural and other elements at the Lump Sum Price of _____ Dollars and _____ Cents ($) Lump Sum	1 LS	$_____
Item 1B – New Emergency Generator and Transformer – For furnishing and installing a new emergency generator appurtenances and electrical elements, installation of concrete transformer pad, site restoration and other elements at the Lump Sum Price of _____ Dollars and _____ Cents ($) Lump Sum	1 LS	$_____
Item 2 – Cash Allowance		
Item 2A – Cash Allowance for National Grid Work– For furnishing and installing work related to National Grid new electrical service and transformer at the Lump Sum Price of Fifteen Thousand Dollars		

and Zero Cents
($ 15,000.00) Lump Sum 1 LS$ 15,000.00

Item 2B – Cash Allowance for National Fuel Gas Work– For furnishing and installing work related to National Fuel Gas new gas service at the Lump Sum Price of
Fifteen Thousand Dollars

and Zero Cents
($ 15,000.00) Lump Sum 1 LS$ 15,000.00

Item 2C- Cash Allowance for PLC and SCADA System Work – For furnishing and installation work related to the integration of the new equipment (pumps, actuators, VFDs, meters, gauges, etc) into the ECWA PLC and SCADA system at the Lump Sum Price of
Fifteen Thousand Dollars

and Zero Cents
($ 15,000.00) Lump Sum 1 LS$ 15,000.00

Item 3 – Contingency Allowance

Item 3A – For Contingency Allowance at the Lump Sum Price of
Two Hundred Thousand Dollars

and Zero Cents
($ 200,000.00) Lump Sum 1 LS$ 200,000.00

TOTAL BID AMOUNT (This total is for convenience in comparing Bids and is not an official part of this Bid.) $_____ (Figures)

_____

_____Dollars and _____ Cents
(Written Amount)

ERIE COUNTY WATER AUTHORITY
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NEW PUMP STATION AT THE NEWSTEAD WATER STORAGE TANK

Unit prices have been computed in accordance with paragraph 11.03.B of the General Conditions.

Bidder acknowledges that estimated quantities of items of Unit Price Work are not guaranteed and final payment will be based on actual quantities of Unit Price Work performed as provided in the Contract Documents.

6.01 Bidder agrees that the Work will be substantially complete and completed and ready for final payment in accordance with Paragraph 14.07.B of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

6.02 Bidder accepts the provisions of the Agreement as to liquidated and special damages in the event of failure to complete the Work within the times specified above.

7.01 The following documents are attached to and made a condition of this Bid:

A. Required Bid security in the amount of _____ Dollars ($_____).

B. Section 2875 of the Public Authorities Law.

C. Section 2876 of the Public Authorities Law.

D. Section 2878 of the Public Authorities Law, Non-Collusive Bidding Certification.

E. State Finance Law Requirements

F. Section 139-L of the State Finance Law, Statement relating to Sexual Harassment Policy.

G. Required Bidder Qualifications Statement with supporting data.

H. All addenda

8.01 The terms used in this Bid will have the meanings indicated in the Instructions to Bidders and the General Conditions and Supplementary Conditions.

Respectfully submitted on _____, 20__.

ERIE COUNTY WATER AUTHORITY
CONTRACT NO: NC-043
NEW PUMP STATION AT THE NEWSTEAD WATER STORAGE TANK

If Bidder is:

An Individual

By _____
(Individual's Signature)

_____
(Printed or Typed Name of Individual)

Doing business as _____

License or Registration Number: _____

Business Address: _____

_____

Phone No.: _____ FAX No.: _____

A Partnership

By _____
(Firm Name)

_____
(General Partner's Signature)

_____
(Printed or Typed Name of General Partner)
(Attach evidence of authority to sign.)

License or Registration Number: _____

Business Address: _____

_____

Phone No.: _____ FAX No.: _____

ERIE COUNTY WATER AUTHORITY
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NEW PUMP STATION AT THE NEWSTEAD WATER STORAGE TANK

A Corporation

By _____
(Corporation Name)

_____
(State of Incorporation)

By _____
(Signature of Officer Authorized to Sign)

_____
(Printed or Typed Name and Title of Officer Authorized to Sign)
(Attach evidence of authority to sign.)

(CORPORATE

SEAL)

Attest _____
(Secretary)

License or Registration Number: _____

Business Address: _____

_____

Phone No.: _____ FAX No.: _____

ERIE COUNTY WATER AUTHORITY
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NEW PUMP STATION AT THE NEWSTEAD WATER STORAGE TANK

Limited Liability Company

By _____
(Firm Name)

_____
(State of Formation)

By _____
(Signature of Member/Authorized to Sign)

_____
(Printed or Typed Name and Title of Member Authorized to Sign)
(Attach evidence of authority to sign.)

License or Registration Number: _____

Business Address: _____

_____

Phone No.: _____ FAX No.: _____

ERIE COUNTY WATER AUTHORITY
CONTRACT NO: NC-043
NEW PUMP STATION AT THE NEWSTEAD WATER STORAGE TANK

A Joint Venture

Joint Venture Name: _____

By _____
(Signature)

_____ _____
(Printed or Typed Name) (Title)

_____
(Address)

By _____
(Signature)

_____ _____
(Printed or Typed Name) (Title)

_____
(Address)

Phone and FAX number and address for receipt of communications to joint venture:

_____

_____

_____

(Each joint venturer must sign. The manner of signing for each individual, partnership, corporation or limited liability company that is a party to the joint venture shall be in the manner indicated above).

END OF BID FORM

ERIE COUNTY WATER AUTHORITY
BUFFALO, NEW YORK

CONTRACT NO: NC-043
NEW PUMP STATION AT THE NEWSTEAD WATER STORAGE TANK
PROJECT NO: 2021-00048

SECTION 00430

BID FORM SUPPLEMENTS

Bid Security Form

Section 2875 of the Public Authorities Law

Section 2876 of the Public Authorities Law

Section 2878 of the Public Authorities Law

State Finance Law Requirements

Statement Regarding Prevention of Unlawful Discriminatory Practices

BID SECURITY FORM

BIDDER (Name and Address):

_____
_____
_____

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

_____
_____
_____

OWNER:
Erie County Water Authority
295 Main Street, Room 350
Buffalo, New York 14203

BID
BID DUE DATE:_____

PROJECT:
Contract No: NC-043
NEW PUMP STATION AT THE NEWSTEAD WATER STORAGE TANK
Project No: 202100048

BOND
BOND NUMBER:_____
DATE: (Not later than Bid due date):_____
PENAL SUM: _____ _____
(Words) (Figures)

IN WITNESS WHEREOF, Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER	SURETY
_____(Seal)	_____(Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By:_____	By:_____
Signature and Title	Signature and Title (Attach Power of Attorney)
Attest:_____	Attest:_____
Signature and Title	

1.01 Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to OWNER upon default of Bidder the penal sum set forth on the face of this Bond.

2.01 Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by OWNER) the executed Agreement required by the Bidding Documents and any performance and payment Bonds required by the Bidding Documents.

3.01 This obligation shall be null and void if:

A. OWNER accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by OWNER) the executed Agreement required by the Bidding Documents and any performance and payment Bonds required by the Bidding Documents, or

B. All Bids are rejected by OWNER, or

C. OWNER fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by paragraph 5.01 hereof).

4.01 Payment under this Bond will be due and payable upon default by Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from OWNER, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5.01 Surety waives notice of and any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by OWNER and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.

6.01 No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in paragraph 4.01 above is received by Bidder and Surety and in no case later than one year after Bid due date.

7.01 Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8.01 Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9.01 Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent or representative, who executed this Bond on behalf of Surety to execute, seal and deliver such Bond and bind the Surety thereby.

10.01 This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11.01 The term "Bid" as used herein includes a Bid, offer or proposal as applicable.

END OF BID BOND

SECTION 2875 OF THE PUBLIC AUTHORITIES LAW

§2875. GROUND FOR CANCELLATION OF CONTRACT BY PUBLIC AUTHORITY.

A clause shall be inserted in all specifications or contracts hereafter made or awarded by any public authority or by any official of any public authority created by the state or any political subdivision, for work or services performed or to be performed or goods sold or to be sold, to provide that upon the refusal of a person, when called before a grand jury, head of a state department, temporary state commission, or other state agency, the organized crime task force in the department of law, head of a city department, or other city agency, which is empowered to compel the attendance of witnesses and examine them under oath, to testify in an investigation concerning any transaction or contract had with the state, any political subdivision thereof or of a public authority, to sign a waiver of immunity against subsequent criminal prosecution or to answer any relevant question concerning such transaction or contract.

(a) Such person, and any firm, partnership or corporation of which he is a member, partner, director or officer shall be disqualified from thereafter selling to or submitting bids to or receiving awards from or entering into any contracts with any public authority or official thereof, for goods, work or services, for a period of five years after such refusal, and to provide also that;

(b) any and all contracts made with any public authority or official thereof, since the effective date of this law, by such person and by any firm, partnership or corporation of which he is a member, partner, director or officer may be canceled or terminated by the public authority without incurring any penalty or damages on account of such cancellation or termination, but any monies owing by the public authority for goods delivered or work done prior to the cancellation termination shall be paid.

This is to CERTIFY that neither the undersigned nor any member, partner, director, or officer of the firm has refused to sign a waiver of immunity against subsequent criminal prosecution or to answer any relevant question concerning a transaction or contract with the state, any political subdivision thereof, a public authority or with a public department, agency or official of the state or of any political subdivision thereof or of a public authority, when called before a grand jury, head of a state department, temporary state commission, or other state agency, the organized crime task force in the department of law, head of a city department, or other city agency, which is empowered to compel the attendance of witnesses and examine them under oath.

_____
(Name of Individual, Partnership or Corporation)

By _____
(Person authorized to sign)

(SEAL)

SECTION 2876 OF THE PUBLIC AUTHORITIES LAW

§2876. DISQUALIFICATION TO CONTRACT WITH PUBLIC AUTHORITY

Any person who, when called before a grand jury, head of a state department, temporary state commission or other state agency, the organized crime task force in the department of law, head of a city department or other city agency, which is empowered to compel the attendance of witnesses and examine them under oath to testify in an investigation concerning any transaction or contract had with the state, any political subdivision thereof, a public authority or with a public department, agency or official of the state or of any political subdivision thereof or of a public authority, refuses to sign a waiver of immunity against subsequent criminal prosecution or to answer any relevant questions concerning such transaction or contract, and any firm, partnership or corporation of which he is a member, partner, director or officer shall be disqualified from thereafter selling to or submitting bids to or receiving awards from or entering into any contracts with any public authority or any official of any public authority created by the state or any political subdivision, for goods, work or services, for a period of five years after such refusal or until a disqualification shall be removed pursuant to the provisions of section twenty-six hundred three of this article.

It shall be the duty of the officer conducting the investigation before the grand jury, the head of a state department, the chairman of the temporary state commission or other state agency, the organized crime task force in the department of law, the head of a city department or other city agency before which the refusal occurs to send notice of such refusal, together with the names of any firm, partnership or corporation of which the person so refusing is known to be a member, partner, officer or director, to the commissioner of transportation of the state of New York, or the commissioner of general services as the case may be, and the appropriate departments, agencies and officials of the state, political subdivisions thereof or public authorities with whom the persons so refusing and any firm, partnership or corporation of which he is a member, partner, director or officer, is known to have a contract. However, when such refusal occurs before a body other than a grand jury, notice of refusal shall not be sent for a period of ten days after such refusal occurs. Prior to the expiration of this ten day period, any person, firm, partnership or corporation which has become liable to the cancellation or termination of a contract or disqualification to contract on account of such refusal may commence a special proceeding at a special term of the supreme court, held within the judicial district in which the refusal occurred, for an order determining whether the questions in response to which the refusal occurred were relevant and material to the inquiry. Upon the commencement of such proceeding, the sending of such notice of refusal to answer shall be subject to order of the court in which the proceeding was brought in a manner and on such terms as the court may deem just. If a proceeding is not brought within ten days, notice of refusal shall thereupon be sent as provided herein.

SECTION 2878 OF THE PUBLIC AUTHORITIES LAW

§2878. STATEMENT OF NON-COLLUSION IN BIDS OR PROPOSALS TO PUBLIC AUTHORITY.

(1) Every bid or proposal hereafter made to a public authority or to any official of any public authority created by the state or any political subdivision, where competitive bidding is required by statute, rule, regulation or local law, for work or services performed or to be performed or goods sold or to be sold, shall contain the following statement subscribed by the bidder and affirmed by such bidder as true under the penalties of perjury:

NON-COLLUSIVE BIDDING CERTIFICATION

(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 (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 (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 (a) has published price lists, rates, or tariffs covering items to be procured, (b) has informed prospective customers of proposed or pending publication of new or revised price lists for such items, or (c) 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 subparagraph one (a).

The undersigned CERTIFIES, under penalty of perjury, that he is authorized to make this bid and execute this statement of non-collusion; that each of the statements contained in (1), (2) and (3) of paragraph (a) are true; that he is familiar with the statements and restrictions contained in paragraph (b) and the paragraph regarding the publication of price lists, etc. and such statements and restrictions are true and have been complied with by the bidder.

_____

(Name of Individual, Partnership, or Corporation)

By _____

(SEAL)

FORMS A, B, and C

STATE FINANCE LAW REQUIREMENTS

The Erie County Water Authority (the "Authority") is a government entity, as that term is defined in State Finance Law §§ 139-j(1)(a) and 139-k(1)(a). When the Authority seeks to procure goods or services by means of an Invitation or Notice to Bid, or a Request for Proposals, the State Finance Law imposes certain restrictions on anyone who may wish to offer goods or services to the Authority as an Offerer, as that term is defined in §§ 139-j(1)(h) and 139-k(1)(h).

During the Restricted Period, as defined in §§ 139-j(1)(f) and 139-k(1)(f), when bids or proposals are being solicited, the Authority will designate a contact person with whom the Offerer may contact for information and other authorized purposes as set forth in §139-j of the State Finance Law. The designated contact is identified in the Notice to Bidders, or in the Request for Proposal. An Offerer is authorized to contact the Authority's designated contact for such purposes as set forth in § 139-j(3).

Pursuant to the State Finance Law, the Authority is also required to make certain findings before making any determinations as to the qualifications and eligibility of those seeking a procurement contract, as that term is defined in State Finance Law §§ 139-j(1)(g) and 139-k(1)(g). Certain findings of non-responsibility can result in rejection for contract award and in the event of two findings of non-responsibility occurring within a 4-year period, the Offerer will be debarred from obtaining procurement contracts with the Authority. Further information about these requirements can be found in §§139−j and 139−k of the New York State Finance Law and the Erie County Water Authority's Procurement Disclosure Policy.

The following forms will be used by the Authority to make such findings:

Form A - Offerer's Affirmation of Understanding of, and Agreement to Comply with, the Authority's Permissible Contact Requirements During the Restricted Period.

Form B - Offerer's Certification of Compliance with State Finance Law.

Form C - Offerer's Disclosure of Prior Non-Responsibility Determinations.

FORM A

Offerer's Affirmation of Understanding of, and Agreement to Comply with, the Permissible Contact Requirements During the Restricted Period

Instructions:

The Erie County Water Authority (the "Authority") is a government entity, as that term is defined in State Finance Law §§ 139-j(1)(a) and 139-k(1)(a). The Authority must obtain a written affirmation of understanding and agreement to comply with procedures regarding permissible contacts with the Authority in the restricted period for a procurement contract in accordance with State Finance Law §139−j and §139−k. It is required that this affirmation be obtained as early as possible in the procurement process, but no later than when the Offerer submits its proposal.

Offerer affirms that it understands and agrees to comply with the procedures of the Authority relative to permissible contacts as required by State Finance Law §139−j(3) and §139−j(6)(b).

By: _____ Date: _____

Name: _____

Title: _____

Contractor Name: _____

Contractor Address: _____

_____

_____

FORM B

Offerer's Certification of Compliance With State Finance Law §139−k(5)

Instructions:

The Erie County Water Authority (the "Authority") is a government entity, as that term is defined in State Finance Law §§ 139-j(1)(a) and 139-k(1)(a). The Authority must obtain a Certification that the information submitted for a procurement contract is complete, true, and accurate regarding any prior findings of non-responsibility, such as non-responsibility pursuant to State Finance Law §139−j. The Offerer must agree to sign the Certification, under penalty of perjury, and to provide the Certification to the Authority. The Certification should be obtained as early as possible in the process, but no later than when an Offerer submits its proposal.

Offerer Certification:

I certify that all information provided to the Authority relating to the awarding of a procurement contract is complete, true, and accurate.

By: _____ Date: _____

Name: _____

Title: _____

Contractor Name: _____

Contractor Address: _____

_____

_____

FORM C

Offerer's Disclosure of Prior Non-Responsibility Determinations

Background:

The Erie County Water Authority (the "Authority") is a government entity, as that term is defined in State Finance Law §§ 139-j(1)(a) and 139-k(1)(a). New York State Finance Law §139−k(2) obligates the Authority to obtain specific information regarding prior non-responsibility determinations with respect to State Finance Law §139−j. In accordance with State Finance Law §139−k, an Offerer must be asked to disclose whether there has been a finding of non-responsibility made within the previous four (4) years by any Governmental Entity due to: (a) a violation of State Finance Law §139−j; or (b) the intentional provision of false or incomplete information to a Government Entity.

The terms "Offerer" and "Governmental Entity" are defined in State Finance Law §§139−j(1). and §139−k(1), These sections also set forth detailed requirements about the restrictions on contacts during the procurement process. A violation of State Finance Law §139−j includes, but is not limited to, an impermissible contact during the restricted period (for example, contacting a person or entity other than the designated contact person, when such contact does not fall within one of the exemptions).

As part of its responsibility determination, State Finance Law §139−k(3) mandates consideration of whether an Offerer fails to timely disclose accurate or complete information regarding the above non-responsibility determination. In accordance with law, no Procurement Contract shall be awarded to any Offerer that fails to timely disclose accurate or complete information under this section, unless a finding is made that the award of the Procurement Contract to the Offerer is necessary to protect public property or public health safety, and the Offerer is the only source capable of supplying the required Article of Procurement, as that term is defined in State Finance Law §§ 139-j(1)(b) and 139-k(1)(b), within the necessary timeframe. See State Finance Law §139−j(10)(b) and §139−k(3).

Instructions:

The Authority must include a disclosure request regarding prior non-responsibility determinations in accordance with State Finance Law §139−k in its solicitation of proposals or bid documents or specifications or contract documents, as applicable, for procurement contracts. The attached form is to be completed and submitted by the individual or entity seeking to enter into a Procurement Contract. It shall be submitted to the Authority conducting the Governmental Procurement no later than when the Offerer submits its proposal.

FORM C (Continued)

Offerer's Disclosure of Prior Non-Responsibility Determinations

Name of Individual or Entity Seeking to Enter into the Procurement Contract:

_____

Address: _____

_____

Name and Title of Person Submitting this Form: _____

_____

Contract Procurement Number: _____

Date: _____

1. Has any Governmental Entity made a finding of non-responsibility regarding the individual or entity seeking to enter into the Procurement Contract in the previous four years? (Please circle): No Yes

   If yes, please answer the next questions:

2. Was the basis for the finding of non-responsibility due to a violation of State Finance Law §139−j (Please circle): No Yes

3. Was the basis for the finding of non-responsibility due to the intentional provision of false or incomplete information to a Governmental Entity? (Please circle) No Yes

4. If you answered yes to any of the above questions, please provide details regarding the finding of non-responsibility below.

Governmental Entity: _____

Date of Finding of Non-Responsibility: _____

Basis of Finding of Non-Responsibility: _____

_____

_____

_____

_____

_____

(Add additional pages as necessary)

FORM C (Continued)

5. Has any Governmental Entity or other governmental agency terminated or withheld a Procurement Contract with the above-named individual or entity due to the intentional provision of false or incomplete information? (Please circle): No Yes

6. If yes, please provide details below.
   Governmental Entity: _____

   Date of Termination or Withholding of Contract: _____

   Basis of Termination or Withholding:

   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____

   (Add additional pages as necessary)

Offerer certifies that all information provided to the Erie County Water Authority with respect to State Finance Law §139−k is complete, true, and accurate.

By: _____ Date: _____
Signature

Name: _____

Title: _____

CONTRACT TERMINATION PROVISION

Instructions:

A Contract Termination Provision will be included in each procurement contract governed by State Finance Law §139−k. New York State Finance Law §139-k(5) provides that every procurement contract award subject to the provisions of State Finance Law §§139−k and 139−j shall contain a provision authorizing the governmental entity to terminate the contract in the event that the certification is found to be intentionally false or intentionally incomplete. This statutory contract language authorizes, but does not mandate, termination. "Government Entity" and "procurement contract" are defined in State Finance Law §§ 139 j(1) and 139−k(l).

This required clause will be included in a covered procurement contract.

A sample of the Termination Provision is included below. If a contract is terminated in accordance with State Finance Law §139−k(5), the Erie County Water Authority, as a governmental entity, is required to include a statement in the procurement record describing the basis for any action taken under the termination provision.

Sample Contract Termination Provision

The Erie County Water Authority, as a governmental entity, reserves the right to terminate this contract in the event it is found that the certification filed by the Offerer in accordance with New York State Finance Law §139−k was intentionally false or intentionally incomplete. Upon such finding, the Authority may exercise its termination right by providing written notification to the Offerer in accordance with the written notification terms of this contract.

OFFERER'S STATEMENT REGARDING PREVENTION OF UNLAWFUL DISCRIMINATORY PRACTICES

The Erie County Water Authority (the "Authority"), as an employer in New York State, is subject to the Human Rights Law, codified as Executive Law §290, *et. seq.*, and Labor Law §201-g. The Authority seeks to provide a work environment that is free from unlawful discriminatory practices as they are defined in Executive Law §296, as well as from inappropriate harassing conduct even if not deemed unlawful, to its employees, contractors, subcontractors, vendors, consultants, and any other person providing services on Authority premises. Pursuant to the Human Rights Law, it shall be unlawful to discriminate against an individual, or to subject an individual to harassment, due to age, race, creed, color, national origin, sexual orientation, gender identity or expression, military status, sex, disability, predisposing genetic characteristics, familial status, marital status, or status as a victim of domestic violence. Accordingly, the Authority requires that any Offeror of a proposal or bid, agree to sign the following statement regarding unlawful discriminatory practices, including, but not limited to sexual harassment, under penalty of perjury. This statement should be provided to the Authority as early as possible in the procurement process, but not later than at the time of execution of a contract with the Authority. Failure to agree to sign the statement may result in the Authority deeming the bid or proposal withdrawn by the Offerer.

Offerer Statement:

I certify, under penalty of perjury, that the following statements are accurate:

- *Offerer is aware of its obligations under the Human Rights Law (Executive Law §290, et. seq.*
- *Offerer complies with the provisions of Executive Law §290, et. seq., including Executive Law §296, and does not permit unlawful discriminatory practices or harassment based on an individual's age, race, creed, color, national origin, sexual orientation, gender identity or expression, military status, sex, disability, predisposing genetic characteristics, familial status, marital status, or status as a victim of domestic violence in its workplace.*
- *Offerer complies with the provisions of Labor Law §201-g, has implemented a written policy addressing sexual harassment in the workplace which meets the minimum standards of Labor Law §201-g, and provides annual sexual harassment prevention training to all of its employees.*

By: _____ Date: _____

Name: _____

Title: _____

Offerer Name: _____

Offerer Address: _____

END OF BID FORM SUPPLEMENTS

ERIE COUNTY WATER AUTHORITY
BUFFALO, NEW YORK

CONTRACT NO: NC-043
NEW PUMP STATION AT THE NEWSTEAD WATER STORAGE TANK
PROJECT NO: 202100048

SECTION 00450

BIDDER'S QUALIFICATION STATEMENT

(Completion of this statement is required in advance of consideration for award of Contract.)

SUBMITTED TO:

Service Center Front Desk
Erie County Water Authority
3030 Union Road
Cheektowaga, New York 14227

SUBMITTED FOR:

Erie County Water Authority
Contract No: NC-043
New Pump Station at the Newstead Water Storage Tank
ECWA Project No. 202100048

SUBMITTED BY:

Name of Organization: _____
(Print or Type Name of Bidder)

Name of Individual: _____

Title: _____

Business Address: _____

_____

Telephone No.: _____

Fax No.: _____

Gentlemen:

The undersigned certifies under oath the truth and correctness of all statements and of all answers to questions made hereinafter.

(Note: Attach additional sheets as required.)

1.0 Bidder's General Business Information

1.1 Check if:

☐ Corporation ☐ Partnership ☐ Joint Venture ☐ Sole Proprietorship

If Corporation:

A. Date and State of Incorporation:

_____

_____

B. List of Executive Officers:

Name	Title

If Partnership:

A. Date and State of Organization:

_____

_____

B. Names of Current General Partners:

_____

_____

C. Type of Partnership

☐ General ☐ Publicly Traded

☐ Limited ☐ Other (described): _____

If Joint Venture:

A. Date and State of Organization:

_____
_____

B. Name, Address and Form of Organization of Joint Venture Partners: (Indicate managing partner by an asterisk *):

_____
_____
_____
_____
_____

If Sole Proprietorship:

A. Date and State of Organization:

_____
_____

B. Name and Address of Owner or Owners:

_____
_____
_____
_____

2.0 How many years has your organization been in business as a general contractor? _____

3.0 Has your organizational structure changed within the past five years? □ Yes □ No

If the answer to this question is "yes", provide data as listed above in Item 1.0 for your previous organization.

_____
_____
_____
_____

4.0 We normally perform _____ percent of the work with our own forces. List work normally subcontracted.

_____
_____

5.0 Has any construction contract to which you have been a party been terminated by the owner; have you ever terminated work on a project prior to its completion for any reason; has any surety which issued a performance bond on your behalf ever completed the work in its own name or financed such completion on your behalf; has any surety expended any monies in connection with a contract for which they furnished a bond on your behalf?

☐ Yes ☐ No

If the answer to any portion of this question is "yes", furnish details of all such occurrences including name of owner, architect or engineer, and surety, and name and date of project.

_____
_____
_____
_____

6.0 Has any officer or partner of your organization ever been an officer or partner of another organization that had any construction contract terminated by the owner; terminated work on a project prior to its completion for any reason; had any surety which issued a performance bond complete the work in its own name or financed such completion; or had any surety expend any monies in connection with a contract for which they furnished a bond?

☐ Yes ☐ No

If the answer to any portion of this question is "yes", furnish details of all such occurrences including name of owner, architect or engineer, and surety, and name and date of project.

_____
_____
_____
_____

7.0 In the last five years, has your organization, or any predecessor organization, failed to substantially complete a project in a timely manner?

☐ Yes ☐ No

If the answer to this question is "yes", furnish details of all such occurrences including name of owner, architect or engineer, and surety, and name and date of project.

_____
_____
_____
_____

8.0 On Schedule A, attached, list name, location and description of project, owner, architect or engineer, contract price, percent complete and scheduled completion of the major construction projects your organization has in progress on this date. Provide name, address and telephone number of a reference for each project listed.

9.0 On Schedule B, attached, list name, location and description of project, owner, architect or engineer, contract price, date of completion and percent of work with your own forces of major projects of the same general nature as this project which your organization has completed in the past five years. Provide name, address and telephone number of a reference for each project listed.

10.0 On Schedule C, attached, list name and construction experience of the principal individuals of your organization directly involved in construction operations.

10.1 On Schedule D, attached, list OSHA Information requested.

11.0 List the states and categories of construction in which your organization is legally qualified to do business.

_____

_____

12.0 Provide the following for your surety:

12.1 Surety Company: _____

12.2 Agent: _____

A. Address: _____

B. Telephone No.: _____

12.3 What is your approximate total bonding capacity?

□ $500,000 to $2,000,000
□ $2,000,000 to $5,000,000
□ $5,000,000 to $10,000,000
□ $10,000,000 or more

13.0 Provide the following with respect to an accredited banking institution familiar with your organization.

13.1 Name of Bank: _____

13.2 Address: _____

13.3 Account Manager: _____

13.4 Telephone No.: _____

14.0 Provide the name, address and telephone number of an individual who represents a major equipment/material supplier whom the Owner may contact for a financial reference:

_____

_____

15.0 Attach a financial statement, prepared on an accrual basis, in a form which clearly indicates Bidder's assets, liabilities and net worth.

15.1 Date of financial statement: _____

15.2 Name of firm preparing statement: _____

16.0 Dated at _____, this _____ day of _____, 2022.

Bidder: _____
(Print or Type Name of Bidder)

By: _____

_____

Title: _____

Attachments A, B, C, and D

(Seal, if corporation)

----------(Affidavit for Individual)----------

_____ being duly sworn, deposes and says that: a) the financial statement, taken from his/her books, is a true and accurate statement of his/her financial condition as of the date thereof; and b) all of the foregoing qualification information is true, complete, and accurate.

----------(Affidavit for Partnership)----------

_____ being duly sworn, deposes and says that: a) he/she is a member of the partnership of _____; b) he/she is familiar with the books of said partnership showing its financial condition; c) the financial statement, taken from the books of said partnership, is a true and accurate statement of the financial condition of the partnership as of the date thereof; and d) all of the foregoing qualification information is true, complete, and accurate.

----------(Affidavit for Corporation)----------

_____ being duly sworn, deposes and says that: a) he/she is _____ of _____; (Full name of Corporation) b) he/she is familiar with the books of said corporation showing its financial condition; c) the financial statement, taken from the books of said corporation, is a true and accurate statement of the financial condition of said corporation as of the date thereof; and d) that all of the foregoing qualification information is true, complete, and accurate.

----------(Acknowledgment)----------

_____ being duly sworn, deposes and says that he/she is _____ of _____; (Name of Bidder) that he/she is duly authorized to make the foregoing affidavit and that he/she makes it on behalf of ( ) himself/herself; ( ) said partnership; ( ) said corporation.

Sworn to before me this _____ day of _____, 2022, in the County of _____, State of _____.

_____
(Notary Public)

My commission expires _____

(Seal)

END OF BIDDER QUALIFICATIONS STATEMENT

ATTACHMENT A

SCHEDULE A
PROJECTS IN PROGRESS

Name, Location and Description of Project	Owner	Architect or Engineer	Contract Price	Percent Complete	Scheduled Completion	Reference/Contract Include Address and Phone

ATTACHMENT B

SCHEDULE B
PROJECTS COMPLETED

Name, Location and Description of Project	Owner	Architect or Engineer	Date Completed	Contract Price	Percent with Own Forces	Reference/Contract Include Address and Phone

ATTACHMENT C

SCHEDULE C
PERSONNEL

Name	Position	Date Started With This Organization	Date Started In Construction	Prior Positions and Experience In Construction

ATTACHMENT D

SCHEDULE D
OSHA INFORMATION

List all Occupational Safety and Health Administration Citations for the last three years, including date, subject matter, and penalty.

Attach copies of all determined Citations and Notification of Penalty, Form OSHA 2.

Describe all pending cases, giving pertinent information such as apparent violations, location of project, type of project, and present status.

List any additional information on the back or attach a separate sheet if necessary.

ERIE COUNTY WATER AUTHORITY
BUFFALO, NEW YORK

CONTRACT NO: NC-043
NEW PUMP STATION AT THE NEWSTEAD WATER STORAGE TANK
PROJECT NO: 202100048

SECTION 00500

AGREEMENT

THIS AGREEMENT is dated as of the _____ day of _____ in the year 2022, by and between the ERIE COUNTY WATER AUTHORITY (hereinafter called OWNER) and (hereinafter called CONTRACTOR).

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

ARTICLE 1 - WORK

1.01 CONTRACTOR shall at its own cost and expense furnish all labor, services, tools, materials, equipment and incidentals necessary to complete all Work as specified or indicated in the Contract Documents to perform all specified work required for installation a duplex pump system, associated piping and accessories, emergency generator and appurtenances at the Newstead Water Storage Tank. The Work includes all related work as shown on the drawings and described in the specifications. The Work is generally described in Section 011000 of the General Requirements.

ARTICLE 2 - ENGINEER

2.01 The Project has been designed by Nussbaumer & Clarke, Inc., 3556 Lake Shore Road, Suite 500, Buffalo, NY 14219 who is hereinafter called the ENGINEER. Nussbaumer & Clarke, Inc. will assume all duties and responsibilities and have the rights and authority assigned to ENGINEER in connection with completion of the Work in accordance with the Contract Documents.

ARTICLE 3 - CONTRACT TIMES

3.01 Time of the Essence

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

3.02 Days to Achieve Milestones, Substantial Completion and Final Payment

A. Milestone M1 is to complete all submittals in the contract documents from initial submittal through final approval by the OWNER AND ENGINEER. Milestone M1 shall be completed 80 working days from the receipt of the Notice to Proceed.

B. The Work shall be substantially completed by October 31, 2022, and completed and ready for final payment in accordance with paragraph 14.07 of the General Conditions by November 30, 2022.

ARTICLE 4 - LIQUIDATED AND SPECIAL DAMAGES

4.01 Liquidated Damages

A. OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and OWNER will suffer financial loss, apart from the costs described in Paragraph 4.02, if the Work is not substantially completed within the time specified in Article 3 for each Milestone and Substantial Completion, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. OWNER and CONTRACTOR also recognize the delays, expense and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by OWNER if the Work is not substantially 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:

1. Milestone M1: $ 750.00 for each calendar day that expires after the date specified in Article 3.02 for Milestone M1 until Milestone M1 is complete.
2. Substantial Completion: $ 750.00 for each calendar day after the Substantial Completion date as specified in Article 3.02 until the work is substantially complete.

4.02 Special Damages:

A. In addition to the amount provided for liquidated damages, CONTRACTOR shall pay OWNER the actual costs reasonably incurred by OWNER for engineering and inspection forces employed for the Work for each day that expires after the days specified in Article 3 for Substantial Completion (adjusted for any changes thereof made in accordance with Article 12 of the General Conditions) until the Work is substantially complete.

B. After Substantial Completion, if CONTRACTOR shall neglect, refuse or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by OWNER, CONTRACTOR shall pay OWNER the actual costs

reasonably incurred by OWNER for engineering and inspection forces employed for the Work for each day that expires after the time specified in Article 3 for Work to be completed and ready for final payment (adjusted for any extensions thereof made in accordance with Article 12 of the General Conditions) until the Work is completed and ready for final payment.

4.03 Liquidated Damages for Deficiencies in Maintenance and Protection of Traffic

Calendar days during which there are substantial deficiencies in compliance with the requirements of Section 015526 Maintenance and Protection of Traffic and on applicable Contract Drawings will be considered deficient days for Maintenance and Protection of Traffic. The CONTRACTOR shall pay OWNER $400.00 per day for each calendar day determined to be substantially deficient by ENGINEER. The cost for the proper maintenance and protection of traffic as defined in SECTION 015526 and on the applicable Contract Drawings is to be included under various items of the contract; no separate bid item is included for maintenance and protection of traffic.

4.04 OWNER may deduct liquidated damages and special damages as determined by the provisions of this Article 4 from progress payments due CONTRACTOR under this Agreement.

ARTICLE 5 - CONTRACT PRICE

5.01 OWNER shall pay CONTRACTOR, in current funds, for completion of the Work in accordance with the Contract Documents the prices stated in CONTRACTOR'S Bid, which Bid is attached hereto and identified as Exhibit 1 of this Agreement. As provided in paragraph 11.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by ENGINEER as provided in paragraph 9.08 of the General Conditions. Unit prices have been computed as provided in paragraph 11.03 of the General Conditions.

ARTICLE 6 - PAYMENT PROCEDURES

6.01 Submittal and Processing of Payments

A. CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed as provided in the General Conditions.

6.02 Progress Payments; Retainage

A. OWNER shall make monthly progress payments on account of the Contract Price on the basis of CONTRACTOR'S Applications for Payment as recommended by

ENGINEER. CONTRACTOR'S Applications for Payment will be due on the last day of the month. All progress payments will be on the basis of the progress of the Work measured by the schedule of values provided for in paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work, based on the number of units completed and accepted) or, in the event there is no schedule of values, as provided in the General Requirements. A progress payment will not be made whenever the value of the Work completed since the last previous progress payment is less than ten thousand dollars ($10,000).

1. Prior to Substantial Completion

    a. Progress payments will be made in the amount of 95 percent of the Work completed, (with the balance being retainage), less the aggregate of payments previously made and less such amounts as ENGINEER shall determine, or OWNER may withhold, in accordance with paragraph 14.02 of the General Conditions; and

    b. 95 percent of the cost of materials and equipment not incorporated in the Work but suitably stored (with the balance being retainage).

2. Upon Substantial Completion, OWNER shall pay an amount sufficient to increase total payments to CONTRACTOR to 100 percent of the Work completed, less such amounts as ENGINEER shall determine in accordance with paragraph 14.02.B.5 of the General Conditions and less 200 percent of ENGINEER'S estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

6.03 Final Payment:

A. Upon final completion and acceptance of the Work in accordance with paragraph 14.07 of the General Conditions, OWNER shall pay the remainder of the Contract Price as recommended by ENGINEER as provided in said paragraph 14.07.

ARTICLE 7 - INTEREST

7.01 All moneys not paid when due hereunder shall bear interest at the maximum rate allowed by law at the place of the Project.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

8.01 As part of the inducement for OWNER to enter into this Agreement CONTRACTOR makes the following representations:

A. CONTRACTOR has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

B. 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, and performance for the Work.

C. CONTRACTOR is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work.

D. CONTRACTOR has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in paragraph 4.02 of the General Conditions, and (2) reports and drawings of a Hazardous Environmental Condition identified at the Site, if any, which have been identified in the Supplementary Conditions as provided in paragraph 4.06 of the General Conditions.

E. CONTRACTOR has obtained and carefully studied (or assumes responsibility for having done so) all examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may effect cost, progress or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by CONTRACTOR, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Contract Documents to be employed by CONTRACTOR, and safety precautions and programs incident thereto.

F. CONTRACTOR does not consider that any further examinations, investigations, explorations, tests, studies or data are necessary for the performance of the Work at the Contract Price, within the Contract Times and in accordance with the other terms and conditions of the Contract Documents.

G. 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.

H. 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.

I. 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.

J. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

ARTICLE 9 - CONTRACT DOCUMENTS

9.01 The Contract Documents consist of the following:

A. This Agreement (10 pages).

B. Performance Bond (2 pages).

C. Payment Bond (2 pages).

D. General Conditions (42 pages).

E. Supplementary Conditions (10 pages).

F. Specifications, as listed in the table of contents of the Project Manual.

G. Appendix A - Women and Minority Business Enterprise Policy.

H. Appendix B - Insurance Requirements.

I. Appendix C - Prevailing Wage Rate Schedule.

K. Appendix D - Easements.

L. The Drawings comprising a set entitled: Contract No: NC-043, New Pump Station at the Newstead Water Storage Tank and including:

M. Addenda consisting of Numbers____ to ____, inclusive.

N. Exhibits to the Agreement enumerated as follows:

1. Exhibit 1, Bid Form (10 pages).

O. The following, which may be delivered or issued on or after the Effective Date of the Agreement, and are not attached hereto:

1. Notice to Proceed
2. Written Amendments
3. Work Change Directives
4. Change Order(s)

9.02 The documents listed in paragraph 9.01 above are attached to this Agreement (except as expressly noted otherwise above). Documents not attached are incorporated by reference. There are no Contract Documents other than those listed in this Article 9.

9.03 The Contract Documents may only be amended, modified or supplemented as provided in paragraph 3.04 of the General Conditions.

ARTICLE 10 - MISCELLANEOUS

10.01 Terms

A. Terms used in this Agreement will have the meanings indicated in the General Conditions.

10.02 Assignment of Contract

A. No assignment by a party hereto of any rights under or interests in the Contract 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.

10.03 Successors and Assigns

A. 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.

10.04 Severability

A. Any provision or part of the Contract Document, 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.

10.05 Waiver

A. The waiver by the OWNER of any breach or violation of any term, covenant, or condition of this Agreement or of any Law or Regulation shall not be deemed to be a waiver of any other term, covenant, condition, or Law or Regulation or of any

subsequent breach or violation of the same or of any other term, covenant, condition, or Law or Regulation. The subsequent payment of any monies or fee by the OWNER which may become due hereunder shall not be deemed to be a waiver of any preceding breach or violation by CONTRACTOR of any term, covenant, condition of this Agreement or of any applicable Law or Regulation.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on the day and year first written above.

This Agreement will be effective on _____, 2022.

OWNER: Erie County Water Authority	CONTRACTOR: _____
By: _____	By: _____
Title: _____	Title: _____
[CORPORATE SEAL]	[CORPORATE SEAL]
Attest _____	Attest _____
Address for giving notices	Address for giving notices
_____	_____
_____	_____
(If OWNER is a corporation, partnership, or limited liability company, attach evidence of authority to sign) (If OWNER is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of Agreement.)	License No. _____ (where applicable) Agent for service of process: _____ _____ (If CONTRACTOR is a corporation, partnership, or limited liability company, attach evidence of authority to sign.)

Designated Representative:	Designated Representative:
Name: _____	Name: _____
Title: _____	Title: _____
Address: _____	Address: _____
Phone No.: _____	Phone No.: _____
Fax No.: _____	Fax No.: _____

END OF AGREEMENT

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):

Erie County Water Authority
295 Main Street, Room 350
Buffalo New York 14203

CONTRACT
Date:
Amount:
Description: ERIE COUNTY WATER AUTHORITY
CONTRACT NO: NC-043
NEW PUMP STATION AT THE
NEWSTEAD WATER STORAGE TANK
PROJECT No. 202100048

BOND
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and CONTRACTOR, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent or representative.

CONTRACTOR AS PRINCIPAL		SURETY	
Company:	(Corp. Seal)	Company:	(Corp. Seal)
Signature: _____		Signature: _____	
Name and Title:		Name and Title: (Attach Power of Attorney)	

(Space is provided below for signatures of additional parties, if required.)

CONTRACTOR AS PRINCIPAL		SURETY	
Company:	(Corp. Seal)	Company:	(Corp. Seal)
Signature: _____		Signature: _____	
Name and Title:		Name and Title:	

EJCDC No. 1910-28-A (1996 Edition)
Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, and the American Institute of Architects.

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

2. If the CONTRACTOR performs the Contract, the Surety and the CONTRACTOR have no obligation under this Bond, except to participate in conferences as provided in paragraph 3.1.

3. If there is no OWNER Default, the Surety's obligation under this Bond shall arise after:

3.1. The OWNER has notified the CONTRACTOR and the Surety at the addresses described in paragraph 10 below, that the OWNER is considering declaring a CONTRACTOR Default and has requested and attempted to arrange a conference with the CONTRACTOR and the Surety to be held not later than fifteen days after receipt of such notice to discuss methods of performing the Contract. If the OWNER, the CONTRACTOR and the Surety agree, the CONTRACTOR shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive the OWNER'S right, if any, subsequently to declare a CONTRACTOR Default; and

3.2. The OWNER has declared a CONTRACTOR Default and formally terminated the CONTRACTOR'S right to complete the Contract. Such CONTRACTOR Default shall not be declared earlier than twenty days after the CONTRACTOR and the Surety have received notice as provided in paragraph 3.1; and

3.3. The OWNER has agreed to pay the Balance of the Contract Price to:

3.3.1. The Surety in accordance with the terms of the Contract; or

3.3.2 Another contractor selected pursuant to paragraph 4.3 to perform the Contract.

4. When the OWNER has satisfied the conditions of paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

4.1. Arrange for the CONTRACTOR, with consent of the OWNER, to perform and complete the Contract; or

4.2. Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or

4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the OWNER for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by the OWNER and the contractor selected with the 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 the OWNER the amount of damages as described in paragraph 6 in excess of the Balance of the Contract Price incurred by the OWNER resulting from the CONTRACTOR Default; or

4.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances;

4.4.1 After investigation, determine the amount for which it may be liable to the OWNER and, as soon as practicable after the amount is determined, tender payment therefor to the OWNER; or

4.4.2 Deny liability in whole or in part and notify the OWNER citing reasons therefor.

5. If the Surety does not proceed as provided in paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond fifteen days after receipt of an additional written notice from the OWNER to the Surety demanding that the Surety perform its obligations under this Bond, and the OWNER shall be entitled to enforce any remedy available to the OWNER. If the Surety proceeds as provided in paragraph 4.4, and the OWNER refuses the payment tendered or the Surety has denied pliability, in whole or in part, without further notice the OWNER shall be entitled to enforce any remedy available to the OWNER.

6. After the OWNER has terminated the CONTRACTOR'S right to complete the Contract, and if the Surety elects to act under paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of the Surety to the OWNER shall not be greater than those of the CONTRACTOR under the Contract, and the responsibilities of the OWNER to the Surety shall not be greater than those of the OWNER under the Contract. To a limit of the amount of this Bond, but subject to commitment by the OWNER of the Balance of the Contract Price to mitigation of costs and damages on the Contract, the Surety is obligated without duplication for:

6.1. The responsibilities of the CONTRACTOR for correction of defective Work and completion of the Contract;

6.2. Additional legal, design professional and delay costs resulting from the CONTRACTOR'S Default, and resulting from the actions or failure to act of the Surety under paragraph 4; and

6.3. Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of the CONTRACTOR.

7. The Surety shall not be liable to the OWNER or others for obligations of the 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 the OWNER or its heirs, executors, administrators, or successors.

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

9. 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 the CONTRACTOR ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

10. Notice to the Surety, the OWNER or the CONTRACTOR shall be mailed or delivered to the address shown on the signature page.

11. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the Contract was be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted here-from and provisions conforming to such statutory or other legal 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.

12. Definitions.

12.1 Balance of the Contract Price: The total amount payable by the OWNER to the CONTRACTOR under the Contract after all proper adjustments have been made, including allowance to the CONTRACTOR of any amounts received or to be received by the OWNER in settlement of insurance or other Claims for damages to which the CONTRACTOR is entitled, reduced by all valid and proper payments made to or on behalf of the CONTRACTOR under the Contract.

12.2. Contract: The agreement between the OWNER and the CONTRACTOR identified on the signature page, including all Contract Documents and changes thereto.

12.3. CONTRACTOR Default: Failure of the CONTRACTOR, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.

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

(FOR INFORMATION ONLY - Name, Address and Telephone)
AGENT or BROKER: OWNER'S REPRESENTATIVE (Engineer):

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):

Erie County Water Authority
295 Main Street, Room 350
Buffalo New York 14203

CONTRACT
Date:
Amount:
Description: ERIE COUNTY WATER AUTHORITY
CONTRACT NO: NC-043
NEW PUMP STATION AT THE
NEWSTEAD WATER STORAGE TANK
PROJECT No. 202100043

BOND
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and CONTRACTOR, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent or representative.

CONTRACTOR AS PRINCIPAL		SURETY	
Company:	(Corp. Seal)	Company:	(Corp. Seal)
Signature: _____		Signature: _____	
Name and Title:		Name and Title: (Attach Power of Attorney)	

(Space is provided below for signatures of additional parties, if required.)

CONTRACTOR AS PRINCIPAL		SURETY	
Company:	(Corp. Seal)	Company:	(Corp. Seal)
Signature: _____		Signature: _____	
Name and Title:		Name and Title:	

EJCDC No. 1910-28-B (1996 Edition)
Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, the American Institute of Architects, the American Subcontractors Association, and the Associated Specialty Contractors.

1. The CONTRACTOR and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the OWNER to pay for labor, materials and equipment furnished for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to the OWNER, this obligation shall be null and void if the CONTRACTOR:

2.1. Promptly makes payment, directly or indirectly, for all sums due Claimants, and

2.2. Defends, indemnifies and holds harmless the OWNER from all claims, demands, liens or suits by any person or entity who furnished labor, materials or equipment for use in the performance of the Contract, provided the OWNER has promptly notified the CONTRACTOR and the 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 the CONTRACTOR and the Surety, and provided there is no OWNER Default

3. With respect to Claimants, this obligation shall be null and void if the CONTRACTOR promptly makes payment, directly or indirectly, for all sums due.

4. The Surety shall have no obligation to Claimants under this Bond until:

4.1. Claimants who are employed by or have a direct contract with the CONTRACTOR have given notice to the Surety (at the addresses described in paragraph 12) and sent a copy, or notice thereof, to the 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 the CONTRACTOR:

4.2.1 Have furnished written notice to the CONTRACTOR and sent a copy, or notice thereof, to the 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 were furnished or supplied or for whom the labor was done or performed; and

4.2.2 Have either received a rejection in whole or in part from the CONTRACTOR, or not received within 30 days of furnishing the above notice any communication from the CONTRACTOR by which the CONTRACTOR had indicated the claim will be paid directly or indirectly; and

4.2.3 Not having been paid within the above 30 days, have sent a written notice to the Surety and sent a copy, or notice thereof, to the OWNER, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to the CONTRACTOR.

5. If a notice required by paragraph 4 is given by the OWNER to the CONTRACTOR or to the Surety, that is sufficient compliance.
6. When the Claimant has satisfied the conditions of paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:

6.1. Send an answer to the Claimant, with a copy to the 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. The 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 the Surety.

8. Amounts owed by the OWNER to the CONTRACTOR under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any Performance Bond. By the CONTRACTOR furnishing and the OWNER accepting this Bond, they agree that all funds earned by the CONTRACTOR in the performance of the Contract are dedicated to satisfy obligations of the CONTRACTOR and the Surety under this Bond, subject to the OWNER'S priority to use the funds for the completion of the Work.

9. The Surety shall not be liable to the OWNER, Claimants or others for obligations of the CONTRACTOR that are unrelated to the Contract. The 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. The 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 Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the OWNER or the CONTRACTOR shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, the OWNER or the 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 or other legal requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal 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, the 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 the CONTRACTOR or with a Subcontractor of the 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 the CONTRACTOR and the CONTRACTOR'S Subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

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

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

(FOR INFORMATION ONLY - Name, Address and Telephone)
AGENT or BROKER: OWNER'S REPRESENTATIVE (Engineer):

ERIE COUNTY WATER AUTHORITY
BUFFALO, NEW YORK

CONTRACT NO: NC-043
NEW PUMP STATION AT THE NEWSTEAD WATER STORAGE TANK
PROJECT NO: 202100048

SECTION 00700

GENERAL CONDITIONS

Adapted with permission from Standard General Conditions of the Construction Contract, EJCDC No. 1910-8 (1996 Edition).

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GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Contract Documents and printed with initial or all capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof.

1. *Addenda*--Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the Contract Documents.

2. *Agreement*--The written instrument which is evidence of the agreement between OWNER and CONTRACTOR covering the Work.

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. *Asbestos*--Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

5. *Bid*--The offer or proposal of a bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

6. *Bidding Documents*--The Bidding Requirements and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).

7. *Bidding Requirements*--The Advertisement or Invitation to Bid, Instructions to Bidders, Bid security form, if any, and the Bid form with any supplements.

8. *Bonds*--Performance and payment bonds and other instruments of security.

9. *Change Order*--A document recommended by ENGINEER 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, issued on or after the Effective Date of the Agreement.

10. *Claim*--A demand or assertion by OWNER or CONTRACTOR seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*--The entire and integrated written agreement between the OWNER and CONTRACTOR concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*--The Contract Documents establish the rights and obligations of the parties and include the Agreement, Addenda (which pertain to the Contract Documents), CONTRACTOR'S Bid (including documentation accompanying the Bid and any post Bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Agreement, the Notice to Proceed, the Bonds, these General Conditions, the Supplementary Conditions, the Specifications and the Drawings as the same are more specifically identified in the Agreement, together with all Written Amendments, Change Orders, Work Change Directives, Field Orders, and ENGINEER'S written interpretations and clarifications issued on or after the Effective Date of the Agreement. Approved Shop Drawings and the reports and drawings of subsurface and physical conditions are not Contract Documents. Only printed or hard copies of the items listed in this paragraph are Contract Documents. Files in electronic media format of text, data, graphics, and the like that may be furnished by OWNER to CONTRACTOR are not Contract Documents.

13. *Contract Price*--The moneys payable by OWNER to CONTRACTOR for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times*--The number of days or the dates stated in the Agreement to: (i) achieve Substantial Completion; and (ii) complete the Work so that it is ready for final payment as evidenced by ENGINEER'S written recommendation of final payment.

15. *CONTRACTOR*--The individual or entity with whom OWNER has entered into the Agreement.

16. *Cost of the Work*--See paragraph 11.01.A for definition.

17. *Drawings*--That part of the Contract Documents prepared or approved by ENGINEER which graphically shows the scope, extent, and character of the Work to be performed by CONTRACTOR. Shop Drawings and other CONTRACTOR submittals are not Drawings as so defined.

18. *Effective Date of the Agreement*--The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

19. *ENGINEER*--The individual or entity named as such in the Agreement.

20. *ENGINEER'S Consultant*--An individual or entity having a contract with ENGINEER to furnish services as ENGINEER'S independent professional associate or consultant with respect to the Project and who is identified as such in the Supplementary Conditions.

21. *Field Order*--A written order issued by ENGINEER which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

22. *General Requirements*--Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

23. *Hazardous Environmental Condition*--The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.

24. *Hazardous Waste*--The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

25. *Laws and Regulations; Laws or Regulations*--Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

26. *Liens*--Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

27. *Milestone*--A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

28. *Notice of Award*--The written notice by OWNER to the apparent successful bidder stating that upon timely compliance by the apparent successful bidder with the conditions precedent listed therein, OWNER will sign and deliver the Agreement.

29. *Notice to Proceed*--A written notice given 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 under the Contract Documents.

30. *OWNER*--The individual, entity, public body, or authority with whom CONTRACTOR has entered into the Agreement and for whom the Work is to be performed.

31. *Partial Utilization*--Use by OWNER of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work.

32. *PCBs*--Polychlorinated biphenyls.

33. *Petroleum*--Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

34. *Project*--The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part as may be indicated elsewhere in the Contract Documents.

35. *Project Manual*--The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

36. *Radioactive Material*--Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

37. *Resident Project Representative*--The authorized representative of ENGINEER who may be assigned to the Site or any part thereof.

38. *Samples*--Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

39. *Shop Drawings*--All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for CONTRACTOR and submitted by CONTRACTOR to illustrate some portion of the Work.

40. *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 for access thereto, and such other lands furnished by OWNER which are designated for the use of CONTRACTOR.

41. *Specifications*--That part of the Contract Documents consisting of written technical descriptions of materials, equipment, systems, standards, and workmanship as applied to the Work and certain administrative details applicable thereto.

42. *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 at the Site.

43. *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.

44. *Supplementary Conditions*--That part of the Contract Documents which amends or supplements these General Conditions.

45. *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 any Subcontractor.

46. *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 those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

47. *Unit Price Work*--Work to be paid for on the basis of unit prices.

48. *Work*--The entire completed 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, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

49. *Work Change Directive*--A written statement to CONTRACTOR issued on or after the Effective Date of the Agreement and signed by OWNER and recommended by ENGINEER ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

50. *Written Amendment*--A written statement modifying the Contract Documents, signed by OWNER and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the nonengineering or nontechnical rather than strictly construction-related aspects of the Contract Documents.

1.02 *Terminology*

A. *Intent of Certain Terms or Adjectives*

1. Whenever in the Contract Documents the terms "as ordered," "as directed," "as required," "as allowed," "as approved," or terms of like effect or import are used to authorize an exercise of professional judgment by the ENGINEER, or 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 completed Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed 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 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 paragraph 9.10 or any other provision of the Contract Documents.

B. *Day*

1. The word "day" shall constitute a calendar day of 24 hours measured from midnight to the next midnight.

C. *Defective*

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it does not conform to the Contract Documents or does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents, or 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 14.04 or 14.05).

D. *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. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of CONTRACTOR, "provide" is implied.

E. Unless stated otherwise in the Contract Documents, words or phrases which 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*

A. When CONTRACTOR delivers the executed Agreements to OWNER, CONTRACTOR shall also deliver to OWNER such Bonds as CONTRACTOR may be required to furnish.

2.02 *Copies of Documents*

A. OWNER shall furnish to CONTRACTOR up to ten copies of the Contract Documents. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *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 Agreement 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 Agreement. 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 Agreement, whichever date is earlier.

2.04 *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 the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

A. *CONTRACTOR'S Review of Contract Documents:* Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. CONTRACTOR shall promptly report in writing to ENGINEER any conflict, error, ambiguity, or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any Work affected thereby; however, 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 knew or reasonably should have known thereof.

B. *Preliminary Schedules:* Within ten days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), CONTRACTOR shall submit to ENGINEER for its 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 Documents;

2. a preliminary schedule of Shop Drawing and Sample submittals which will list each required submittal and the times for submitting, reviewing, and processing such submittal; 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.

C. *Evidence of Insurance:* Before any Work at the Site is started, CONTRACTOR and OWNER shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which CONTRACTOR and OWNER respectively are required to purchase and maintain in accordance with Article 5.

2.06 *Preconstruction Conference*

A. Within 20 days after the Contract Times start to run, but before any Work at the Site is started, a conference attended by 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 2.05.B, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

2.07 *Initial Acceptance of Schedules*

A. Unless otherwise provided in the Contract Documents, at least ten 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 2.05.B. CONTRACTOR shall have an additional ten 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 any specified Milestones and 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 Shop Drawing and Sample 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 component parts of the Work.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is called for by one is as binding as if called for 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. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to OWNER.

C. Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER as provided in Article 9.

3.02 *Reference Standards*

A. *Standards, Specifications, Codes, Laws, and Regulations*

1. Reference to standards, specifications, manuals, 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, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement 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 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 Contract Documents, nor shall any such provision or instruction be effective to assign to OWNER, ENGINEER, or any of ENGINEER'S Consultants, agents, or employees 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 Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. If, during the performance of the Work, CONTRACTOR discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, CONTRACTOR shall report it to ENGINEER in writing at once. CONTRACTOR shall not proceed with the Work affected thereby (except in an emergency as required by paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in paragraph 3.04; provided, however, that CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any such conflict, error, ambiguity, or discrepancy unless CONTRACTOR knew or reasonably should have known thereof.

B. *Resolving Discrepancies*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

a. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); 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 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways: (i) a Written Amendment; (ii) a Change Order; or (iii) a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways: (i) a Field Order; (ii) ENGINEER'S

approval of a Shop Drawing or Sample; or (iii) ENGINEER'S written interpretation or clarification.

3.05 *Reuse of Documents*

A. CONTRACTOR and any Subcontractor or Supplier or other individual or entity performing or furnishing any of the Work under a direct or indirect contract with OWNER: (i) shall not 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 ENGINEER'S Consultant, including electronic media editions; and (ii) shall not reuse any of 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 adaption by ENGINEER. This prohibition will survive final payment, completion, and acceptance of the Work, or termination or completion of the Contract. Nothing herein shall preclude CONTRACTOR from retaining copies of the Contract Documents for record purposes.

ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; REFERENCE POINTS

4.01 *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. OWNER will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If CONTRACTOR and OWNER are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in OWNER'S furnishing the Site, CONTRACTOR may make a Claim therefor as provided in paragraph 10.05.

B. CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

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

1. those reports of explorations and tests of subsurface conditions at or contiguous to the Site that ENGINEER has used in preparing the Contract Documents; and

2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that ENGNEER has used in preparing the Contract Documents.

B. *Limited Reliance by CONTRACTOR on Technical Data Authorized:* CONTRACTOR may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," CONTRACTOR may not rely upon or make any Claim against OWNER, ENGINEER, or any of ENGINEER'S Consultants 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.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If CONTRACTOR believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed 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 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; 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 6.16.A), notify OWNER and ENGINEER in writing about such condition. CONTRACTOR shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *ENGINEER'S Review:* After receipt of written notice as required by paragraph 4.03.A, ENGINEER will promptly review the pertinent condition, determine the necessity of OWNER'S obtaining additional exploration or tests with respect thereto, and advise OWNER in writing (with a copy to CONTRACTOR) of ENGINEER'S findings and conclusions.

C. *Possible Price and Times Adjustments*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition 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 meet any one or more of the categories described in paragraph 4.03.A; and

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 paragraphs 9.08 and 11.03.

2. CONTRACTOR shall not be entitled to any adjustment in the Contract Price or Contract Times if:

a. CONTRACTOR knew of the existence of such conditions at the time CONTRACTOR made a final commitment to OWNER in respect of Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for CONTRACTOR prior to CONTRACTOR'S making such final commitment; or

c. CONTRACTOR failed to give the written notice within the time and as required by paragraph 4.03.A.

3. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in paragraph 10.05. However, OWNER, ENGINEER, and ENGINEER'S Consultants shall not be liable to CONTRACTOR for any claims, costs, losses, or 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) sustained by CONTRACTOR on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous 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 shall not be responsible for the accuracy or completeness of any such information or data; 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 such information and data,

b. locating all Underground Facilities shown or indicated in the Contract Documents,

c. coordination of the Work with the owners of such Underground Facilities, including OWNER, during construction, and

d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents, 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 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to OWNER and ENGINEER. ENGINEER will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, CONTRACTOR shall be responsible for the safety and protection of the underground facility.

2. If ENGINEER concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown with reasonable accuracy in the Contract Documents and that CONTRACTOR did not know of and could not reasonably have been expected to be aware of or to have anticipated. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, OWNER or CONTRACTOR may make a Claim therefor as provided in paragraph 10.05.

4.05 *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.

4.06 *Hazardous Environmental Condition at Site*

A. *Reports and Drawings*: Reference is made to the Supplementary Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the ENGINEER in the preparation of the Contract Documents.

B. *Limited Reliance by CONTRACTOR on Technical Data Authorized*: CONTRACTOR may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data", CONTRACTOR may not rely upon or make any Claim against OWNER, ENGINEER or any of ENGINEER'S Consultants 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 any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. CONTRACTOR shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by CONTRACTOR, Subcontractors, Suppliers, or anyone else for whom CONTRACTOR is responsible.

D. If CONTRACTOR encounters a Hazardous Environmental Condition or if CONTRACTOR or anyone for whom CONTRACTOR is responsible creates a Hazardous Environmental Condition, CONTRACTOR shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by paragraph 6.16); and (iii) 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.

E. CONTRACTOR shall not be required to resume Work in connection with such condition or in any affected area until after OWNER has obtained any required permits related thereto and delivered to CONTRACTOR written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. 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, either party may make a Claim therefor as provided in paragraph 10.05.

F. 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. If OWNER and CONTRACTOR cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in paragraph 10.05. OWNER may have such deleted portion of the Work performed by OWNER'S own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER'S Consultants, and the officers, directors, partners, employees, agents, other 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 created by CONTRACTOR or by anyone for whom CONTRACTOR is responsible. Nothing in this paragraph 4.06.G shall obligate CONTRACTOR to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. The provisions of paragraphs 4.02, 4.03, and 4.04 are not intended to apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 - BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

A. CONTRACTOR shall furnish performance and payment Bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all CONTRACTOR'S obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date when final payment becomes due, except as provided otherwise by Laws or Regulations or by the Contract Documents. CONTRACTOR shall also furnish such other Bonds as are required by the Contract Documents.

B. All Bonds shall be in the form prescribed by the Contract Documents, except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All Bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.

C. If the surety on any Bond furnished by CONTRACTOR is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of paragraph 5.01.B, CONTRACTOR shall within 20 days thereafter substitute another Bond and surety, both of which shall comply with the requirements of paragraphs 5.01.B and 5.02.

5.02. *Licensed Sureties and Insurers*

A. All Bonds and insurance required by the Contract Documents to be purchased and maintained by OWNER or CONTRACTOR shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue Bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

A. CONTRACTOR shall deliver to OWNER, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by OWNER or any other additional insured) which CONTRACTOR is required to purchase and maintain. OWNER shall deliver to CONTRACTOR, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by CONTRACTOR or any other additional insured) which OWNER is required to purchase and maintain.

5.04 *CONTRACTOR'S Liability Insurance*

A. CONTRACTOR shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which 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:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;

2. claims for damages because of bodily injury, occupational sickness or disease, or death of CONTRACTOR'S employees;

3. claims for damages because of bodily injury, sickness or disease, or death of any person other than CONTRACTOR'S employees;

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained: (i) by any person as a result of an offense directly or indirectly related to the employment of such person by CONTRACTOR, or (ii) by any other person for any other reason;

5. 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; and

6. 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.

B. The policies of insurance so required by this paragraph 5.04 to be purchased and maintained shall:

1. with respect to insurance required by paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insureds (subject to any customary exclusion in respect of professional liability) OWNER, ENGINEER, ENGINEER'S Consultants, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, and other 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;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include completed operations insurance;

4. include contractual liability insurance covering CONTRACTOR'S indemnity obligations under paragraphs 6.07, 6.11, and 6.20;

5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least thirty days prior written notice has been given to OWNER and CONTRACTOR and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the CONTRACTOR pursuant to paragraph 5.03 will so provide);

6. remain in effect at least until final payment and at all times thereafter when CONTRACTOR may be correcting, removing, or replacing defective Work in accordance with paragraph 13.07; and

7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment (and CONTRACTOR shall furnish OWNER and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to OWNER and any such additional insured of continuation of such insurance at final payment and one year thereafter).

5.05 *OWNER'S Liability Insurance*

A. In addition to the insurance required to be provided by CONTRACTOR under paragraph 5.04, 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.

5.06 *Property Insurance (See Supplementary Conditions)*

5.07 (Not Used)

5.08 (Not Used)

5.09 (Not Used)

5.10 *Acceptance of Bonds and Insurance; Option to Replace*

A. If either OWNER or CONTRACTOR has any objection to the coverage afforded by or other provisions of the Bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by paragraph 2.05.C. OWNER and CONTRACTOR shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the Bonds and insurance required of such party by the Contract Documents, 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. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent Bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.01 *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, but CONTRACTOR shall not be responsible for the negligence of OWNER or ENGINEER in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents. CONTRACTOR shall be responsible to see that the completed Work complies accurately with the Contract Documents.

B. At all times during the progress of the Work, CONTRACTOR shall assign a competent resident superintendent thereto who shall not be replaced without written notice to OWNER and ENGINEER except under extraordinary circumstances. The superintendent will be CONTRACTOR'S representative at the Site and shall have authority to act on behalf of CONTRACTOR. All communications given to or received from the superintendent shall be binding on CONTRACTOR.

6.02 *Labor; Working Hours*

A. CONTRACTOR shall provide competent, suitably qualified personnel to survey, lay out, and construct the Work 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, and CONTRACTOR will not permit overtime work or the performance of Work on Saturday, Sunday, or any legal holiday without OWNER'S written consent (which will not be unreasonably withheld) given after prior written notice to ENGINEER.

6.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the General Requirements, 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.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All warranties and guarantees specifically called for 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. 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.

6.04 *Progress Schedule*

A. CONTRACTOR shall adhere to the progress schedule established in accordance with paragraph 2.07 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 2.07) proposed adjustments in the progress schedule that will not result in changing the Contract Times (or Milestones). Such adjustments will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the progress schedule that will change the Contract Times (or Milestones) shall be submitted in accordance with the requirements of Article 12. Such adjustments may only be made by a Change Order or Written Amendment in accordance with Article 12.

6.05 *Substitutes and "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 specification or description 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 or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to ENGINEER for review under the circumstances described below.

1. "*Or-Equal" Items:* If, in ENGINEER'S sole discretion, 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, it may be considered by ENGINEER as an "or-equal" item, in which case review and approval of the proposed item may, in ENGINEER'S sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this paragraph 6.05.A.1, 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: (i) it is at least equal in quality, durability, appearance, strength, and design characteristics; (ii) it will reliably perform at least equally well the function imposed by the design concept of the completed Project as a functioning whole; and CONTRACTOR;

b. Certifies that: (i) there is no increase in cost to the OWNER; and (ii) it will conform substantially, even with deviations, to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items*

a. If, in ENGINEER'S sole discretion, an item of material or equipment proposed by CONTRACTOR does not qualify as an "or-equal" item under paragraph 6.05.A.1, it will be considered a proposed substitute item.

b. CONTRACTOR shall submit sufficient information as provided below to allow ENGINEER to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR.

c. The procedure for review by ENGINEER will be as set forth in paragraph 6.05.A.2.d, as supplemented in the General Requirements and as ENGINEER may decide is appropriate under the circumstances.

d. CONTRACTOR shall first 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 shall certify that the proposed substitute item will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified, and be suited to the same use as that specified. The application will state the extent, if any, to which the use of the proposed substitute item will prejudice CONTRACTOR'S achievement of Substantial Completion on time, whether or not 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 work on the Project) to adapt the design to the proposed substitute item and whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute item from that specified will be identified in the application, and available engineering, sales, maintenance, repair, and replacement services will be indicated. The application will also contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change, all of which will be considered by ENGINEER in evaluating the proposed substitute item. ENGINEER may require CONTRACTOR to furnish additional data about the proposed substitute item.

B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is shown or indicated in and expressly required by the Contract Documents, CONTRACTOR may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by ENGINEER. CONTRACTOR shall submit sufficient information to allow ENGINEER, in ENGINEER'S sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The procedure for review by ENGINEER will be similar to that provided in subparagraph 6.05.A.2.

C. *Engineer's Evaluation:* ENGINEER will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to paragraphs 6.05.A and 6.05.B. ENGINEER will be the sole judge of acceptability. No "or-equal" or substitute will be ordered, installed or utilized until ENGINEER'S review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or equal." ENGINEER will advise CONTRACTOR in writing of any negative determination.

D. *Special Guarantee:* OWNER may require CONTRACTOR to furnish at CONTRACTOR'S expense a special performance guarantee or other surety with respect to any substitute.

E. *ENGINEER'S Cost Reimbursement:* ENGINEER will record time required by ENGINEER and ENGINEER'S Consultants in evaluating substitute proposed or submitted by CONTRACTOR pursuant to paragraphs 6.05.A.2 and 6.05.B and in making changes in the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) occasioned thereby. Whether or not ENGINEER approves a substitute item so proposed or submitted by CONTRACTOR, CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and ENGINEER'S Consultants for evaluating each such proposed substitute.

F. *CONTRACTOR'S Expense:* CONTRACTOR shall provide all data in support of any proposed substitute or "or-equal" at CONTRACTOR'S expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

A. CONTRACTOR shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to OWNER as indicated in paragraph 6.06.B), whether initially or as a replacement, against whom OWNER may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to OWNER in advance for acceptance by OWNER by a specified date prior to the Effective Date of the Agreement, and if CONTRACTOR has submitted a list thereof in accordance with the Supplementary Conditions, OWNER'S acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. CONTRACTOR shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued or Written Amendment signed. 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 any right of OWNER or ENGINEER to reject defective Work.

C. 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. Nothing in the Contract

Documents 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 shall it create any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

D. CONTRACTOR shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR.

E. CONTRACTOR shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with ENGINEER through CONTRACTOR.

F. 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.

G. All Work performed for CONTRACTOR by a Subcontractor or Supplier will be pursuant to an appropriate agreement between CONTRACTOR and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of OWNER and ENGINEER. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in paragraph 5.06, the agreement between the CONTRACTOR and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against OWNER, CONTRACTOR, ENGINEER, ENGINEER'S Consultants, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, and other 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 such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, CONTRACTOR will obtain the same.

6.07 *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. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER'S Consultants, and the officers, directors, partners, employees or agents, and other consultants 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.

6.08 *Permits*

A. Unless otherwise provided in the Supplementary Conditions, 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 opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. CONTRACTOR shall pay all charges of utility owners for connections to the Work, and OWNER shall pay all charges of such utility owners for capital costs related thereto, such as plant investment fees.

6.09 *Laws and Regulations*

A. CONTRACTOR shall give all notices and 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 knowing or having reason to know that it is contrary to Laws or Regulations, CONTRACTOR shall bear 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; however, it shall not be CONTRACTOR'S primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve CONTRACTOR of CONTRACTOR'S obligations under paragraph 3.03.

6.10 *Taxes*

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

6.11 *Use of Site and Other Areas*

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

1. CONTRACTOR shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, CONTRACTOR shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER'S Consultant, and the officers, directors, partners, employees, agents, and other consultants 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 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 by or based upon CONTRACTOR'S performance of the Work.

B. *Removal of Debris During Performance of the Work:* During the progress of the Work CONTRACTOR shall keep the Site and other 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 make it ready for utilization by OWNER. At the completion of the Work CONTRACTOR shall remove from the Site 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 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 property to stresses or pressures that will endanger it.

6.12 *Record Documents*

A. CONTRACTOR shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Written Amendments, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents, together with all approved Samples and a counterpart of all approved Shop Drawings, will be available to ENGINEER for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to ENGINEER for OWNER.

6.13 *Safety and Protection*

A. CONTRACTOR shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. 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, 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 owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property. All damage, injury, or loss to any property referred to in paragraph 6.13.A.2 or 6.13.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 (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of OWNER or ENGINEER or ENGINEER'S Consultant, 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). CONTRACTOR'S duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and ENGINEER has issued a notice to OWNER and CONTRACTOR in accordance with paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *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.

6.15 *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.

6.16 *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.

6.17 *Shop Drawings and Samples*

A. CONTRACTOR shall submit Shop Drawings to ENGINEER for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals. All submittals will be identified as ENGINEER may require and in the number of copies specified in the General Requirements. The 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 6.17.E.

B. CONTRACTOR shall also submit Samples to ENGINEER for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals. Each Sample will be identified clearly as to material, Supplier, pertinent data such as catalog numbers, and the use for which intended and otherwise as ENGINEER may require to enable ENGINEER to review the submittal for the limited purposes required by paragraph 6.17.E. The numbers of each Sample to be submitted will be as specified in the Specifications.

C. Where a Shop Drawing or Sample is required by the Contract Documents or the schedule of Shop Drawings and Sample submittals acceptable to ENGINEER as required by paragraph 2.07, 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.

D. *Submittal Procedures*

1. Before submitting each Shop Drawing or Sample, CONTRACTOR shall have determined and verified:

a. all field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

b. all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;

c. all information relative to means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto; and

d. CONTRACTOR shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

2. Each submittal shall bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR'S obligations under the Contract Documents with respect to CONTRACTOR'S review and approval of that submittal.

3. At the time of each submittal, CONTRACTOR shall give ENGINEER specific written notice of such variations, if any, that the Shop Drawing or Sample submitted may have from the requirements of the Contract Documents, such notice to be in a written communication separate from the submittal; and, in addition, shall cause a specific notation to be made on each Shop Drawing and Sample submitted to ENGINEER for review and approval of each such variation.

E. *ENGINEER'S Review*

1. ENGINEER will timely review and approve Shop Drawings and Samples in accordance with the schedule of Shop Drawings and Sample 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 (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. ENGINEER'S review and approval of Shop Drawings or Samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER'S attention to each such variation at the time of each submittal as required by paragraph 6.17.D.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 approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for complying with the requirements of paragraph 6.17.D.1.

F. *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.

6.18 *Continuing the Work*

A. 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, except as permitted by paragraph 15.04 or as OWNER and CONTRACTOR may otherwise agree in writing.

6.19 *CONTRACTOR'S General Warranty and Guarantee*

A. CONTRACTOR warrants and guarantees to OWNER, ENGINEER, and ENGINEER'S Consultants that all Work will be in accordance with the Contract Documents and will not be defective. 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.

B. 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 acceptance by OWNER or any failure to do so;

6. any review and approval of a Shop Drawing or Sample submittal or 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.

6.20 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER'S Consultants, and the officers, directors, partners, employees, agents, and other 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:

1. is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of real or personal property (other than the Work itself), including the loss of use resulting therefrom; and

2. is caused in whole or in part by any 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, regardless of whether or not caused in part by an individual or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Laws or Regulations.

B. In any and all claims against OWNER or ENGINEER or any of their respective consultants, agents, officers, directors, partners, or employees 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 6.20.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 6.20.A shall not be limited in any way by the amount or types of insurance provided by CONTRACTOR under Article 5 of the General Conditions.

D. The indemnification obligations of CONTRACTOR under paragraph 6.20.A shall not extend to the sole negligence or willful misconduct of OWNER, ENGINEER or ENGINEER'S Consultants or to the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them.

ARTICLE 7 - OTHER WORK

7.01 *Related Work at Site*

A. OWNER may perform other work related to the Project at the Site by OWNER'S employees, or let other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to CONTRACTOR prior to starting any such other work; and

2. if OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in paragraph 10.05.

B. CONTRACTOR shall afford each other contractor who is a party to such a direct contract and each utility owner (and OWNER, if OWNER is performing the other work with OWNER'S employees) proper and safe access to the Site and a reasonable

opportunity for the introduction and storage of materials and equipment and the execution of such other work and shall properly coordinate the Work with theirs. Unless otherwise provided in the Contract Documents, 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 their work and will only cut or alter their work with the written consent of ENGINEER and the others whose work will be affected. The duties and responsibilities of CONTRACTOR under this paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of CONTRACTOR in said direct contracts between OWNER and such utility owners and other contractors.

C. If the proper execution or results of any part of CONTRACTOR'S Work depends upon work performed by others under this Article 7, 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.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, OWNER shall issue all communications to CONTRACTOR through ENGINEER.

8.02 *Furnish Data*

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

8.03 *Pay Promptly When Due*

A. OWNER shall make payments to CONTRACTOR promptly when they are due as provided in paragraphs 14.02.C and 14.07.C.

8.04 *Lands and Easements; Reports and Tests*

A. OWNER'S duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.01 and 4.05. Paragraph 4.02 refers to OWNER'S identifying and making available to CONTRACTOR copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by ENGINEER in preparing the Contract Documents.

8.05 *Insurance*

A. OWNER'S responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.06 *Change Orders*

A. OWNER is obligated to execute Change Orders as indicated in paragraph 10.03.

8.07. *Inspections, Tests, and Approvals*

A. OWNER'S responsibility in respect to certain inspections, tests, and approvals is set forth in paragraph 13.03.B.

8.08 *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.

8.09 *Undisclosed Hazardous Environmental Condition*

A. OWNER'S responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in paragraph 4.06.

8.10 *Evidence of Financial Arrangements*

A. If and to the extent OWNER has agreed to furnish CONTRACTOR reasonable evidence that financial arrangements have been made to satisfy OWNER'S obligations under the Contract Documents, OWNER'S responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *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 Documents and will not be changed without written consent of OWNER and ENGINEER.

9.02 *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 9.10, and 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.

9.03 *Project Representative*

A. If OWNER and ENGINEER agree, ENGINEER will furnish a Resident Project Representative to assist ENGINEER in providing more extensive observation of the Work. The responsibilities and authority and limitations thereon of any such Resident Project Representative and assistants will be as provided in paragraph 9.10 and in the Supplementary Conditions. 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.

9.04 *Clarifications and Interpretations*

A. ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents as ENGINEER may determine necessary, which shall be consistent with the intent of and reasonably inferable from the Contract Documents. Such written clarifications and interpretations will be binding on OWNER and CONTRACTOR. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a written clarification or interpretation, a Claim may be made therefor as provided in paragraph 10.05.

9.05 *Authorized Variations in Work*

A. ENGINEER may authorize minor variations in the Work from the requirements of the Contract Documents which 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. These may be accomplished by a Field Order and will be binding on OWNER and also on CONTRACTOR, who shall perform the Work involved promptly. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of a Field Order, a Claim may be made therefor as provided in paragraph 10.05.

9.06 *Rejecting Defective Work*

A. ENGINEER will have authority to disapprove or reject Work which ENGINEER believes to be defective, or that ENGINEER believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. ENGINEER will also have authority to require special inspection or testing of the Work as provided in paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.07 *Shop Drawings, Change Orders and Payments*

A. In connection with ENGINEER'S authority as to Shop Drawings and Samples, see paragraph 6.17.

B. In connection with ENGINEER'S authority as to Change Orders, see Articles 10, 11, and 12.

C. In connection with ENGINEER'S authority as to Applications for Payment, see Article 14.

9.08 *Determinations for Unit Price Work*

A. 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 paragraph 10.05.

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

A. ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes and other matters relating to the acceptability of the Work, the quantities and classifications of Unit Price Work, the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, and Claims seeking changes in the Contract Price or Contract Times will be referred initially to ENGINEER in writing, in accordance with the provisions of paragraph 10.05, with a request for a formal decision.

B. When functioning as interpreter and judge under this paragraph 9.09, ENGINEER will not show partiality to OWNER or CONTRACTOR and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by ENGINEER pursuant to this paragraph 9.09 with respect to any such Claim, dispute, or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.07) will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such Claim, dispute, or other matter.

9.10 *Limitations on ENGINEER'S Authority and Responsibilities*

A. Neither ENGINEER'S authority or responsibility under this Article 9 or under any other provision of the Contract Documents 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 14.07.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 9.10 shall also apply to ENGINEER'S Consultants, Resident Project Representative, and assistants.

ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

A. Without invalidating the Agreement and without notice to any surety, OWNER may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Written Amendment, a Change Order, or a Work Change Directive. Upon receipt of any such document, CONTRACTOR shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If OWNER and CONTRACTOR are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times,

or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in paragraph 10.05.

10.02 *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 as provided in paragraph 3.04, except in the case of an emergency as provided in paragraph 6.16 or in the case of uncovering Work as provided in paragraph 13.04.B.

10.03 *Execution of Change Orders*

A. OWNER and CONTRACTOR shall execute appropriate Change Orders recommended by ENGINEER (or Written Amendments) covering:

1. changes in the Work which are: (i) ordered by OWNER pursuant to paragraph 10.01.A, (ii) required because of acceptance of defective Work under paragraph 13.08.A or OWNER'S correction of defective Work under paragraph 13.09, or (iii) agreed to by the parties;

2. 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; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by ENGINEER pursuant to paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, CONTRACTOR shall carry on the Work and adhere to the progress schedule as provided in paragraph 6.18.A.

10.04 *Notification to Surety*

A. If notice 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) is required by the provisions of any Bond to be given to a surety, 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.

10.05 *Claims and Disputes*

A. *Notice:* Written notice stating the general nature of each Claim, dispute, or other matter shall be delivered by the claimant to ENGINEER and the other party to the Contract promptly (but in no event later than 20 days) after the start of the event giving rise thereto. Notice of the amount or extent of the Claim, dispute, or other matter with supporting data shall be delivered to the ENGINEER and the other party to the Contract within 45 days after the start of such event (unless ENGINEER allows additional time for claimant to submit additional or more accurate data in support of such Claim, dispute, or other matter). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to ENGINEER and the claimant within 30 days after receipt of the claimant's last submittal (unless ENGINEER allows additional time).

B. *ENGINEER'S Decision:* ENGINEER will render a formal decision in writing within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any. ENGINEER'S written decision on such Claim, dispute, or other matter will be final and binding upon OWNER and CONTRACTOR unless:

1. an appeal from ENGINEER'S decision is taken within the time limits and in accordance with the dispute resolution procedures set forth in Article 16; or

2. if no such dispute resolution procedures have been set forth in Article 16, a written notice of intention to appeal from ENGINEER'S written decision is delivered by OWNER or CONTRACTOR to the other and to ENGINEER within 30 days after the date of such decision, and a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction within 60 days after the date of such decision or within 60 days after Substantial Completion, whichever is later (unless otherwise agreed in writing by OWNER and CONTRACTOR), to exercise such rights or remedies as the appealing party may have with respect to such Claim, dispute, or other matter in accordance with applicable Laws and Regulations.

C. If ENGINEER does not render a formal decision in writing within the time stated in paragraph 10.05.B, a

decision denying the Claim in its entirety shall be deemed to have been issued 31 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any.

D. No Claim for an adjustment in Contract Price or Contract Times (or Milestones) will be valid if not submitted in accordance with this paragraph 10.05.

ARTICLE 11 - COST OF THE WORK; CASH ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs necessarily incurred and paid by CONTRACTOR in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to CONTRACTOR will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in paragraph 11.01.B.

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 at the Site. 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, 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 11.01.

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, 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 5.06.D), 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 telegrams, long distance telephone calls, telephone service at the Site, expressage, and similar petty cash items in connection with the Work.

i. When the Cost of the Work is used to determine the value of a Change Order or of a Claim, the cost of premiums for additional Bonds and insurance required because of the changes in the Work or caused by the event giving rise to the Claim.

j. When all the Work is performed on the basis of cost-plus, the costs of premiums for all Bonds and insurance CONTRACTOR is required by the Contract Documents to purchase and maintain.

B. *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, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, 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 11.01.A.1 or specifically covered by paragraph 11.01.A.4, all of which 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 paragraphs 11.01.A and 11.01.B.

C. *CONTRACTOR'S Fee:* When all the Work 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 or when a Claim for an 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 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to paragraphs 11.01.A and 11.01.B, 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.

11.02 *Cash 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 as may be acceptable to OWNER and ENGINEER. CONTRACTOR agrees that:

1. the 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 costs, overhead, profit, and other expenses contemplated for the 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.

B. 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.

11.03 *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. 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. Determinations of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by ENGINEER subject to the provisions of paragraph 9.08.

B. 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.

C. For provisions for an adjustment of a unit price for an increase or decrease in the quantity of Unit Price Work, if any, see General Requirements Section 01270, Measurement and Payment.

ARTICLE 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order or by a Written Amendment. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the claim to the ENGINEER and the other party to the Contract in accordance with the provisions of paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for 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, by application of such unit prices to the quantities of the items involved (subject to the provisions of paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in paragraph 11.01) plus a CONTRACTOR'S fee for overhead and profit (determined as provided in paragraph 12.01.C).

C. *CONTRACTOR'S Fee:* 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 11.01.A.1 and 11.01.A.2, the CONTRACTOR'S fee shall be 15 percent;

b. for costs incurred under paragraph 11.01.A.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 paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier

Subcontractor and CONTRACTOR will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

d. no fee shall be payable on the basis of costs itemized under paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

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 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

A. The Contract Times (or Milestones) may only be changed by a Change Order or by a Written Amendment. Any Claim for an adjustment in the Contract Times (or Milestones) shall be based on written notice submitted by the party making the claim to the ENGINEER and the other party to the Contract in accordance with the provisions of paragraph 10.05.

B. Any adjustment of the Contract Times (or Milestones) covered by a Change Order or of any Claim for an adjustment in the Contract Times (or Milestones) will be determined in accordance with the provisions of this Article 12.

12.03 *Delays Beyond CONTRACTOR'S Control*

A. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in paragraph 12.02.A. Delays beyond the control of CONTRACTOR shall include, but not be limited to, acts or neglect by OWNER, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

12.04 *Delays Within CONTRACTOR'S Control*

A. The Contract Times (or Milestones) will not be extended due to delays within the control of CONTRACTOR. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of CONTRACTOR.

12.05 *Delays Beyond OWNER'S and CONTRACTOR'S Control*

A. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of both OWNER and CONTRACTOR, an extension of the Contract Times (or Milestones) in an amount equal to the time lost due to such delay shall be CONTRACTOR'S sole and exclusive remedy for such delay.

12.06 *Delay Damages*

A. In no event shall OWNER or ENGINEER be liable to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from:

1. delays caused by or within the control of CONTRACTOR; or

2. delays beyond the control of both OWNER and CONTRACTOR including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God, or acts or neglect by utility owners or other contractors performing other work as contemplated by Article 7.

B. Nothing in this paragraph 12.06 bars a change in Contract Price pursuant to this Article 12 to compensate CONTRACTOR due to delay, interference, or disruption directly attributable to actions or inactions of OWNER or anyone for whom OWNER is responsible.

ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 *Notice of Defects*

A. Prompt notice of all defective Work of which OWNER or ENGINEER has actual knowledge will be given to CONTRACTOR. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

A. OWNER, ENGINEER, ENGINEER'S Consultants, other representatives and personnel of OWNER, independent testing laboratories, and governmental

agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspecting, and testing. CONTRACTOR shall provide them proper and safe conditions for such access and advise them of CONTRACTOR'S Site safety procedures and programs so that they may comply therewith as applicable.

13.03 *Tests and Inspections*

A. CONTRACTOR shall give ENGINEER timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. OWNER shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to paragraph 13.04.B shall be paid as provided in said paragraph 13.04.B; and

3. as otherwise specifically provided in the Contract Documents.

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 and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for OWNER'S and ENGINEER'S acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to CONTRACTOR'S purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to OWNER and ENGINEER.

E. 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, it must, if requested by ENGINEER, be uncovered for observation.

F. Uncovering Work as provided in paragraph 13.03.E shall be at CONTRACTOR'S expense unless CONTRACTOR has given ENGINEER timely notice of CONTRACTOR'S intention to cover the same and ENGINEER has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

A. If any Work is covered contrary to the written request of ENGINEER, it must, if requested by ENGINEER, be uncovered for ENGINEER'S observation and replaced at CONTRACTOR'S expense.

B. If ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspected or tested by others, 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, furnishing all necessary labor, material, and equipment. If it is found that such Work is defective, 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 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 OWNER shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, OWNER may make a Claim therefor as provided in paragraph 10.05. If, however, such 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 Milestones), 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, CONTRACTOR may make a Claim therefor as provided in paragraph 10.05.

13.05 *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, 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.

13.06 *Correction or Removal of Defective Work*

A. CONTRACTOR shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by ENGINEER, remove it from the Project and replace it with Work that is not defective. 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 removal (including but not limited to all costs of repair or replacement of work of others).

13.07 *Correction Period*

A. If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or 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 land or areas made available for CONTRACTOR'S use by OWNER or permitted by Laws and Regulations as contemplated in paragraph 6.11.A is found to be defective, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER'S written instructions: (i) repair such defective land or areas, or (ii) correct such defective Work or, if the defective Work has been rejected by OWNER, remove it from the Project and replace it with Work that is not defective, and (iii) satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom. If CONTRACTOR does not promptly comply with the terms of such 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, and 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) will be paid by CONTRACTOR.

B. 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 or by Written Amendment.

C. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph 13.07, 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.

D. CONTRACTOR'S obligations under this paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, OWNER (and, prior to ENGINEER'S recommendation of final payment, ENGINEER) prefers to accept it, OWNER may do so. 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) attributable to OWNER'S evaluation of and determination to accept such defective Work (such costs to be approved by ENGINEER as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by CONTRACTOR pursuant to this sentence. If any such acceptance occurs prior to ENGINEER'S recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and OWNER shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, OWNER may make a Claim therefor as provided in paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by CONTRACTOR to OWNER.

13.09 *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 in accordance with paragraph 13.06.A, 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, OWNER may, after seven days written notice to CONTRACTOR, correct and remedy any such deficiency.

B. In exercising the rights and remedies under this paragraph, OWNER shall proceed expeditiously. In connection with such corrective and 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, take possession of CONTRACTOR'S tools, appliances, construction equipment and machinery at the Site, 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 (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) incurred or sustained by OWNER in exercising the rights and remedies under this paragraph 13.09 will be charged against CONTRACTOR, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, OWNER may make a Claim therefor as provided in paragraph 10.05. 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 (or Milestones) 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 13.09.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

A. The schedule of values established as provided in paragraph 2.07.A 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.

14.02 *Progress Payments*

A. *Applications for Payments*

1. At least 10 days before the date established 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 and 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.

B. *Review of Applications*

1. ENGINEER will, within 10 days after receipt of each Application for Payment, 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 on the Site 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, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under paragraph 9.08, and to 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: (i) 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 Documents; or (ii) that 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 to supervise, direct, or control the Work or for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for CONTRACTOR'S failure to comply with Laws and Regulations applicable to CONTRACTOR'S performance of the Work. Additionally, said review or recommendation will not impose responsibility on ENGINEER to make any examination to ascertain how or for what purposes CONTRACTOR has used the moneys paid on account of the Contract Price, or 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 referred to in paragraph 14.02.B.2. ENGINEER may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in ENGINEER'S opinion to protect OWNER from loss because:

a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

b. the Contract Price has been reduced by Written Amendment or Change Orders;

c. OWNER has been required to correct defective Work or complete Work in accordance with paragraph 13.09; or

d. ENGINEER has actual knowledge of the occurrence of any of the events enumerated in paragraph 15.02.A.

C. *Payment Becomes Due*

1. Sixty days after presentation of the Application for Payment to OWNER with ENGINEER'S recommendation, the amount recommended will (subject to the provisions of paragraph 14.02.D) become due, and when due will be paid by OWNER to CONTRACTOR.

D. *Reduction in Payment*

1. OWNER may refuse to make payment of the full amount recommended by ENGINEER because:

a. claims have been made against OWNER on account of CONTRACTOR'S performance or furnishing of the Work;

b. 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;

c. there are other items entitling OWNER to a set-off against the amount recommended; or

d. OWNER has actual knowledge of the occurrence of any of the events enumerated in paragraphs 14.02.B.5.a through 14.02.B.5.c or paragraph 15.02.A.

2. If OWNER refuses to make payment of the full amount recommended by ENGINEER, OWNER must give CONTRACTOR immediate written notice (with a copy to ENGINEER) stating the reasons for

such action 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, when CONTRACTOR corrects to OWNER'S satisfaction the reasons for such action.

3. If it is subsequently determined that OWNER'S refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by paragraph 14.02.C.1.

14.03 *CONTRACTOR'S Warranty of Title*

A. CONTRACTOR warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to OWNER no later than the time of payment free and clear of all Liens.

14.04 *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 (except for items specifically listed by CONTRACTOR as incomplete) and request that ENGINEER issue a certificate of Substantial Completion. Promptly thereafter, 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. If ENGINEER considers the Work substantially complete, ENGINEER will prepare and deliver to OWNER a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. OWNER shall have seven days after receipt of the tentative certificate during which to make written objection to ENGINEER as to any provisions of the certificate or attached list. If, after considering such objections, ENGINEER concludes that the Work is not substantially complete, ENGINEER will within 14 days after submission of the tentative certificate to OWNER notify CONTRACTOR in writing, stating the reasons therefor. If, after consideration of OWNER'S objections, ENGINEER considers the Work substantially complete, ENGINEER will within said 14 days execute and deliver to OWNER and CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as ENGINEER believes justified after consideration of any objections from OWNER. At the time of delivery of the tentative certificate of Substantial Completion ENGINEER will deliver to OWNER and CONTRACTOR a written recommendation as to division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless OWNER and CONTRACTOR agree otherwise in writing and so inform ENGINEER in writing prior to ENGINEER'S issuing the definitive certificate of Substantial Completion, ENGINEER'S aforesaid recommendation will be binding on OWNER and CONTRACTOR until final payment.

B. OWNER shall have the right to exclude CONTRACTOR from the Site after the date of Substantial Completion, but OWNER shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

14.05 *Partial Utilization*

A. Use by OWNER at OWNER'S option of 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, may be accomplished prior to Substantial Completion of all the Work subject to the following conditions.

1. OWNER at any time may request CONTRACTOR in writing to permit OWNER to use any such part of the Work which OWNER believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees that such part of the Work is substantially complete, CONTRACTOR will certify to OWNER and ENGINEER that such part of the Work is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. CONTRACTOR at any time may notify OWNER and ENGINEER in writing that CONTRACTOR considers any such part of the Work ready for its intended use and substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. 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 14.04 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.

2. No occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of the Supplementary Conditions regarding property insurance.

14.06 *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 is incomplete or defective. CONTRACTOR shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *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, marked-up record documents (as provided in paragraph 6.12), and other documents, CONTRACTOR may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by: (i) all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by subparagraph 5.04.B.7; (ii) consent of the surety, if any, to final payment; and (iii) complete and legally effective releases or waivers (satisfactory to OWNER) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in paragraph 14.07.A.2 and as approved by OWNER, CONTRACTOR may furnish receipts or releases in full and an affidavit of CONTRACTOR that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which OWNER or OWNER'S property might in any way be responsible 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.

B. *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 Documents have been fulfilled, ENGINEER will, within 10 days after receipt of the final Application for Payment, indicate in writing ENGINEER'S recommendation of payment and present the Application for Payment to OWNER for payment. 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 14.09. 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. *Payment Becomes Due*

1. Sixty days after the presentation to OWNER of the Application for Payment and accompanying documentation, the amount recommended by ENGINEER will become due and, when due, will be paid by OWNER to CONTRACTOR.

D. *Final Completion Delayed*

1. If, through no fault of CONTRACTOR, final completion of the Work is significantly delayed, and if ENGINEER so confirms, OWNER shall, upon receipt of CONTRACTOR'S final Application for Payment and recommendation of ENGINEER, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by OWNER for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have been furnished as required in paragraph 5.01, the written consent of the surety to the payment of the balance due for that

portion of the Work fully completed and accepted shall be submitted by CONTRACTOR to ENGINEER with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.08 *(Not Used)*

14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by OWNER against CONTRACTOR, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from CONTRACTOR'S continuing obligations under the Contract Documents; and

2. a waiver of all Claims by CONTRACTOR against OWNER other than those previously made in writing which are still unsettled.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

15.01 *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 notice in writing to CONTRACTOR and ENGINEER which will fix the date on which Work will be resumed. CONTRACTOR shall resume the Work on the date so fixed. CONTRACTOR shall be allowed an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if CONTRACTOR makes a Claim therefor as provided in paragraph 10.05.

15.02 *OWNER May Terminate for Cause*

A. The occurrence of any one or more of the following events will 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 established under paragraph 2.07 as adjusted from time to time pursuant to paragraph 6.04);

2. CONTRACTOR'S disregard of Laws or Regulations of any public body having jurisdiction;

3. CONTRACTOR'S disregard of the authority of ENGINEER; or

4. CONTRACTOR'S violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in paragraph 15.02.A occur, OWNER may, after giving CONTRACTOR (and the surety, if any) seven days written notice, terminate the services of CONTRACTOR, exclude CONTRACTOR from the Site, and take possession of the Work and of all CONTRACTOR'S tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by CONTRACTOR (without liability to CONTRACTOR for trespass or conversion), 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 finish the Work as OWNER may deem expedient. In such case, CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds 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) sustained by OWNER arising out of or relating to completing the Work, such excess will be paid to CONTRACTOR. If such claims, costs, losses, and damages exceed 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.

C. 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. Any retention or payment of moneys due CONTRACTOR by OWNER will not release CONTRACTOR from liability.

15.03 *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, elect to terminate the Contract. In

such case, CONTRACTOR shall be paid (without duplication of any items):

1. for 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. for 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;

3. for 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) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. for reasonable expenses directly attributable to termination.

B. CONTRACTOR shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *CONTRACTOR May Stop Work or Terminate*

A. If, through no act or fault of CONTRACTOR, the Work is suspended for more than 90 consecutive days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within 30 days after it is submitted, or OWNER fails for 60 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 15.03. 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 60 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 15.04 are not intended to preclude CONTRACTOR from making a Claim under paragraph 10.05 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 16 - DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Dispute resolution methods and procedures, if any, shall be as set forth in the Supplementary Conditions. If no method and procedure has been set forth, and subject to the provisions of paragraphs 9.09 and 10.05, OWNER and CONTRACTOR may exercise such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any dispute.

ARTICLE 17 - MISCELLANEOUS

17.01 *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 delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

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

17.03 *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 Documents, and 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.

17.04 *Survival of Obligations*

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

17.05 *Controlling Law*

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

17.06 *Headings*

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

END OF GENERAL CONDITIONS

ERIE COUNTY WATER AUTHORITY
BUFFALO, NEW YORK

CONTRACT NO: NC-043
NEW PUMP STATION AT THE NEWSTEAD WATER STORAGE TANK
PROJECT NO: 202100048

SECTION 00800

SUPPLEMENTARY CONDITIONS

SCOPE

These Supplementary Conditions amend or supplement the General Conditions. All provisions of the General Conditions which are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions which are defined in the General Conditions have the meanings assigned to them in the General Conditions.

SC-1.01.A.7. Modify paragraph 1.01.A.7. by changing the word "Advertisement" in the first sentence to "Notice".

SC-1.01.A.43 Add the following to Paragraph 1.01.A.43:

Substantial Completion for a watermain shall be achieved at such time all Work associated with Milestone M1 is complete and the pump station is operational including but not limited to all elements commissioned, tested, disinfected, and issuance of Completed Works Approval by the Erie County Water Authority.

SC-4.01 Add new paragraph immediately after paragraph 4.01.B which is to read as follows:

SC-4.01.C The Erie County Water Authority will provide easements to the extent shown on the contract drawings.

SC-4.02 Add new paragraph immediately after paragraph 4.02.B which is to read as follows:

SC-4.02.C In the preparation of the Drawings and Specifications, ENGINEER has relied upon:

a. Wendel Duchscherer Architects and Engineers, Elevated Storage Tank Construction – Record Drawings dated 2007.

SC-4.06.A Add a new paragraph immediately after paragraph 4.06.A which is to read as follows:

SC-4.06.A.1 In the preparation of the Drawings and Specifications, ENGINEER did not utilize any report or drawing related to a Hazardous Environmental Condition identified at the Site except as identified in SC-4.02.

SC-5.01.A Modify the first part of the second sentence of paragraph 5.01.A of the General Conditions to read:

The payment Bond shall remain in effect for one year and the performance Bond shall remain in effect for two years after....

SC-5.04 through 5.10. Delete paragraph 5.04 through 5.10, inclusive, in their entirety.

SC-5.04 Add two new paragraphs immediately after Paragraph 5.03, which is to read as follows:

"SC-5.04 *Insurance Requirements*

SC-5.04.A. CONTRACTOR shall procure and maintain insurance in accordance with Insurance Requirements, as set forth in the attached Appendix B-1 and hereby made a part of these General Conditions."

SC-5.04.B. CONTRACTOR shall require all direct and indirect subcontractors to procure and maintain insurance in accordance with the Insurance Requirements, as set forth in the Addendum Agreement attached as Appendix B-2 and hereby made a part of these General Conditions."

SC-6.02.B Add new paragraphs immediately after paragraph 6.02.B which are to read as follows:

"SC-6.02.B.1 Except where otherwise prohibited by Laws or Regulations, regular working hours are defined as up to 8 hours per day, beginning no earlier than 7:00 am and ending no later than 6:00 pm.

SC-6.02.B.2 Maintenance and cleanup activities may be performed during hours other than regular working hours provided that such activities do not require the startup or operation of construction equipment.

SC-6.02.B.3 If it shall become absolutely necessary to perform Work at night or on Saturdays, Sundays or legal holidays, written notice shall be submitted to OWNER and ENGINEER at least two days in advance of the need for such Work. OWNER will only consider the performance of such Work as can be performed satisfactorily under the conditions. Sufficient lighting and all other necessary facilities for carrying out and observing the Work shall be provided and maintained where such Work is being performed at night."

SC-6.06.G Modify paragraph 6.06.G. by changing paragraph reference 5.06 to SC-5.04.

SC-6.06.H Add the following new paragraph immediately following paragraph 6.06.G, which is to read as follows:

"SC-6.06.H Before Work commences, the OWNER must review and approve any proposed subcontracting agreement prior to its execution. All Work performed by any SUBCONTRACTOR must be performed under supervision and control of the CONTRACTOR. As used in this paragraph, a SUBCONTRACTOR is defined in GC 1.01.A.42. Any subcontracting agreement must contain an Addendum Agreement in the form set forth in Appendix B-2."

SC-6.06.I Add the following new paragraph immediately following paragraph 6.06.G, which is to read as follows:

"SC-6.06.I The CONTRACTOR shall perform with the CONTRACTOR'S own organization, contract work amounting to not less than fifty percent of the original total contract price. The term "the CONTRACTOR'S own organization" shall be construed to include only workmen employed and paid directly by the CONTRACTOR, and equipment owned or rented by the CONTRACTOR, with or without operators."

SC-6.09.B. Add a new paragraph immediately after paragraph 6.09.B which is to read as follows:

"SC-6.09.C Refer to Article SC-18 for Laws and Regulations which, by terms of said Laws and Regulations are to be included in the Contract Documents. The failure to include in Article SC-18 any Law or Regulation applicable to the performance of the Work does not diminish CONTRACTOR'S responsibility to comply with all Laws and Regulations applicable to the performance of the work."

SC-6.10. Add a new paragraph immediately after paragraph 6.10.A, which is to read as follows:

"SC-6.10.B OWNER is exempt from payment of sales and compensating use taxes of the State of New York and of cities and counties on all materials to be incorporated into the Work.

1. OWNER will furnish the required certificates of tax exemption to CONTRACTOR for use in the purchase of supplies and materials to be incorporated into the Work.
2. OWNER'S exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by CONTRACTOR, or to supplies or materials not incorporated into the Work."

SC-6.15.A. Add a new paragraph immediately after paragraph 6.15.A, which is to read as follows:

"SC-6.15.B 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 all Laws and regulations. CONTRACTOR shall provide a centralized location for the maintenance of the material safety data sheets or other hazard communication information required to be made available by any employer on the Site. Location of the material safety data sheets or other hazard communication information shall be readily accessible to the employees of any employer on the Site."

SC-7.01 Add a new paragraph immediately after Paragraph 7.01 which is to read as follows:

"SC-7.02 *Separate Contractor Claims*

A. Should CONTRACTOR cause damage to the work or property of any other contractor at the Site, or should any claim arising out of CONTRACTOR'S performance of the Work be made by any other contractor against CONTRACTOR, OWNER, or ENGINEER, CONTRACTOR shall promptly settle with such other contractor by agreement, or otherwise resolve the dispute by arbitration or at law.

B. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, and the officer, directors, partners, employees, agents, and other consultants or 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 directly, indirectly, or consequentially out of or relating to any claim or action, legal or equitable, brought by any other contractor against OWNER, ENGINEER, to the extent based upon CONTRACTOR'S performance of the Work.

C. Should another contractor cause damage to the Work or property of CONTRACTOR at the Site or should the performance of work by any other contractor give rise to any other claim, CONTRACTOR shall not institute any action, legal or equitable, against OWNER, ENGINEER, or permit any action against any of them to be maintained and continued in its name or for its benefit in any court or before any arbiter which seeks to impose liability on or to recover damages from OWNER, ENGINEER, on account of any such damage or claim.

D. If CONTRACTOR is delayed at any time in performing or furnishing Work by any act or neglect of another contractor and OWNER and CONTRACTOR are unable to agree as to the extent of any adjustment in

Contract Times attributable thereto, CONTRACTOR may make a claim for an extension of time in accordance with paragraph 10.05. Notwithstanding any other provision of the Contract Documents, an extension of the Contract Times shall be CONTRACTOR'S sole and exclusive remedy with respect to OWNER, ENGINEER, for any delay, disruption, interference or hindrance caused by any other contractor."

SC-9.03 Add a new paragraph immediately after paragraph 9.03.A which is to read as follows:

"SC-9.03.B. Resident Project Representative (RPR) will be OWNER'S agent at the Site, will act as directed by and under the supervision of OWNER, and will confer with OWNER AND ENGINEER regarding RPR's actions. RPR's dealings in matters pertaining to the on-site Work shall in general be with OWNER and CONTRACTOR keeping ENGINEER advised as necessary. RPR's dealings with Subcontractors shall only be through or with the full knowledge and approval of CONTRACTOR."

SC-13.07 Modify paragraphs 13.07.A. and C. by changing the words "one year" in the first line to "two years".

SC-14.02,A. Add a new paragraph immediately after paragraph 14.02.A.3. which is to read as follows:

"4. Each Application for Payment shall be accompanied by a copy of the certified payroll record."

SC-14.07,A. Add a new paragraph immediately after paragraph 14.07.A.3. which is to read as follows:

"4. The Final Application for Payment shall be accompanied by a copy of the certified payroll record."

SC-14.07.A.2 Modify paragraph 14.07.A.2 by changing the words "subparagraph 5.04.B.7" to "SC-5.04".

SC-17.06 Add new paragraphs immediately after paragraph 17.06,A. which are to read as follows:

"ARTICLE SC-18 - STATUTORY REQUIREMENTS

SC-18.01 This Article contains portions of certain Laws or Regulations which, by provision of Law or Regulations, are required to be included in the Contract Documents. The material included in this Article may not be complete or current. CONTRACTOR'S obligation to comply with all Laws and Regulations applicable to the Work is set forth in paragraph 6.09 of the General Conditions.

SC-18.02 Non-Discrimination in Employment:

A. During the performance of this contract, CONTRACTOR agrees as follows:
   1. CONTRACTOR will not discriminate against any employee or applicant for employment because of race, creed, color, or national origin, and will take affirmative action to insure that they are afforded equal employment opportunities without discrimination because of race, creed, color or national origin. Such action shall be taken with reference but not limited to: recruitment, employment, job assignment, promotion, upgrading, demotion, transfer, layoff or termination, rates of pay or other forms of compensation, and selection for training or retraining, including apprenticeship and on-the-job training.
   2. CONTRACTOR will send to each labor union or representative of workers with which he has or is bound by a collective bargaining or other agreement or understanding, a notice, to be provided by the State Commission for Human Rights, advising such labor union or representative of the CONTRACTOR'S agreement under clauses 1. through 8. hereinafter called "non-discrimination clauses". If the CONTRACTOR was directed to do so by the OWNER as part of the Bid or negotiation of this contract, CONTRACTOR shall request labor union or representative to furnish him with a written statement that such labor union or representative will not discriminate because of race, creed, color or national origin and that such labor union or representative either will affirmatively cooperate within the limits of its legal and contractual authority, in the implementation of the policy and provisions of these non-discrimination clauses or that it consents and agrees that recruitment, employment, and the terms and conditions of employment under this contract shall be in accordance with the purposes and provisions of these non-discrimination clauses. If such labor union or representative fails or refuses to comply with such a request, that it furnish such a statement, CONTRACTOR shall promptly notify the State Commission for Human Rights of such failure or refusal.
   3. CONTRACTOR will post and keep posted in conspicuous places, available to employees and applicants for employment, notices to be provided by the State Commission for Human Rights setting forth the substance of the provisions of clauses 1. through 2. and such provisions of the State's Laws against discrimination as the State Commission for Human Rights shall determine.
   4. CONTRACTOR will state, in all solicitations or advertisements for employees placed by or on behalf of CONTRACTOR, that all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, color or national origin.
   5. CONTRACTOR will comply with the provisions of the Executive Law, Human Rights Law, Article 15, will furnish all information and reports deemed necessary by the State Commission for Human Rights under these non-discrimination clauses and such sections of the Executive Law, and will permit access to his books, records and accounts by the State Commission for Human Rights, the Attorney General, District Commissioner of Housing and Community Renewal and the Industrial Commission for purposes of investigation to ascertain compliance with these non-discrimination clauses of the Executive Law, Human Rights Law, Article 15.
   6. This contract may be forthwith canceled, terminated or suspended, in whole or in part, by the OWNER upon the basis of a finding made by the State Commission for Human Rights that CONTRACTOR has not complied with these non-discrimination

clauses, and CONTRACTOR may be declared ineligible for future contracts made by or on behalf of the State or a public authority or agency of the State or housing authority, or an urban renewal agency, or contracts requiring the approval of the Commissioner of Housing and Community Renewal, until he has satisfied the State Commission for Human Rights after conciliation efforts by the Commission have failed to achieve compliance with these non-discrimination clauses and after a verified complaint has been filed with the Commission, notice thereof has been given to CONTRACTOR and an opportunity has been afforded him to be heard publicly before three members of the Commission. Such sanctions may be imposed and remedies invoked independently of or in addition to sanctions and remedies otherwise provided by law.

7. If this contract is canceled or terminated under clause 6., in addition to other rights of the OWNER provided in this contract upon its breach by CONTRACTOR, CONTRACTOR will hold the OWNER harmless against any additional expenses or costs incurred by the OWNER in completing the Work or in purchasing the services, materials, equipment or supplies contemplated by this contract, and the OWNER may withhold payments from CONTRACTOR in an amount sufficient for this purpose and recourse may be had against the surety on the Performance Bond if necessary.
8. CONTRACTOR will include the provisions of clauses 1. through 2. in every subcontract or purchase order altered only to reflect the proper identity of the parties in such a manner that such provisions will be binding upon each Subcontractor or vendor as to operations to be performed within the State of New York. CONTRACTOR will take such actions in enforcing such provisions of such subcontract or purchase order as the OWNER may direct, including sanctions or remedies for non-compliance. If CONTRACTOR becomes involved in or is threatened with litigation with a Subcontractor or vendor as a result of such direction by the OWNER, the CONTRACTOR shall promptly so notify the Attorney General, requesting him to intervene and to protect the interest of the State of New York.

SC-18.03 Affirmative Action Requirements:

A. During the performance of this Contract, the CONTRACTOR agrees that it will abide by and will require its subcontractors to abide by the AUTHORITY'S Affirmative Action Requirements and Women and Minority Business Enterprise Policy, as set forth in the attached Appendix A and hereby made a part of these General Conditions.

SC-18.04 Prevailing Rate Schedule:

A. The labor on this contract shall be performed in accordance with the requirements of Article 8 (Sections 220-223) of the New York State Labor Law. The supplements to be provided and wages to be paid to workers, laborers and mechanics employed on this contract, determined pursuant to Section 220 of the Labor Law, are set forth in Appendix C, Prevailing Rate Schedule, attached to and hereby made a part of these General Conditions.

B. CONTRACTOR shall note that the wage rates and supplemental benefits shown in the attached schedules are subject to change. The wage rates and supplemental benefits to be paid and provided shall be those prevailing at the time the contract is being performed.

SC-18.05 Payments to Subcontractors:

A. In accordance with N.Y. State General Municipal Law, Section 106-b, CONTRACTOR shall:

1. Within fifteen calendar days of the receipt of any payment from the OWNER, the CONTRACTOR shall pay each of his Subcontractors and materialmen the proceeds from the payment representing the value of the work performed and/or materials furnished by the Subcontractor and/or materialman and reflecting the percentage of the Subcontractor's work completed or the materialman's material supplied in the requisition approved by the OWNER and based upon the actual value of the subcontract or purchase order less an amount necessary to satisfy any claims, liens or judgments against the Subcontractor or materialman which have not been suitably discharged and less any retained amount as hereafter described. The CONTRACTOR shall retain not more than five per centum of each payment to the Subcontractor and/or materialman except that the CONTRACTOR may retain in excess of five per centum but not more than ten per centum of each payment to the Subcontractor provided that prior to entering into a subcontract with the CONTRACTOR, the Subcontractor is unable or unwilling to provide a Performance bond and a Labor and Material bond both in the full amount of the subcontract at the request of the CONTRACTOR. However, the CONTRACTOR shall retain nothing from those payments representing proceeds owed the Subcontractor and/or materialman from OWNER'S payments to the CONTRACTOR for the remaining amounts of the contract balance after the work or portions thereof are substantially complete. Within fifteen calendar days of the receipt of payment from the CONTRACTOR, the Subcontractor and/or materialman shall pay each of his Subcontractors and materialmen in the same manner as the CONTRACTOR has paid the Subcontractor. Nothing provided herein shall create any obligation on the part of the OWNER to pay or to see to the payment of any moneys to any Subcontractor or materialman from any CONTRACTOR nor shall anything provided herein serve to create any relationship in contract or otherwise, implied or expressed, between the Subcontractor or materialman and the OWNER.

SC-18.06 Erie County Water Authority Apprenticeship Policy

A. During the performance of this Contract, the CONTRACTOR, its assigns, and designees, agree that it will abide by and will require its Subcontractors to abide by the Erie County Water Authority's Apprenticeship Policy, as stated in paragraph B of this Section.

B. That pursuant to New York State Labor Law §816-B, the Erie County Water Authority hereby mandates that all contractors and subcontractors entering into any construction contracts with the Erie County Water Authority shall have established apprenticeship agreements appropriate for the type and scope of work to be performed under the contract, that have been approved by the New York State Commissioner of Labor and shall require the employment of apprentices on Erie County Water Authority construction projects.

SC-18.07 Purchases by Other Local Governments

C. The Erie County Water Authority (the "Authority") has adopted the following resolution for the purpose of allowing the following named local governments (the "Participants") to make purchases through the Authority bidding procedures.

D. Under the following conditions, the Director of Administration may make purchasing services available to the following Participants:
   1. When in the opinion of the Director of Administration it will not create any burden or hardship upon the Authority and the anticipated prices will not be adversely affected thereby, the Director is authorized when he deems appropriate and as may be requested by the Participants to provide in any particular Authority bid specification that the Participants listed below shall have the right to make purchases based upon the bids received by the Authority.
   2. The Director of Administration, within the limits of his time and manpower, shall disseminate relevant contract information to the Participants.
   3. The Participants in Authority contracts will issue purchase orders directly to vendors within the specified contract period referencing the Authority contract involved and be liable for any payments due on such purchase orders.

E. Bidders shall take notice that as a condition of the award of an Authority contract pursuant to these specifications, the successful bidder agrees to accept the award of a similar contract with any of the Participants listed below if called upon to do so. The Authority, however, will not be responsible for any debts incurred by the Participants pursuant to this or any other agreement.

F. Necessary deviations from the Authority's specifications in the award of a Participant's contract, particularly as such deviations may relate to quantities or delivery point shall be a matter to be resolved between the successful bidder and Participants. All inquiries regarding prospective contracts shall be directed to the attention of:
   1. ANGOLA VILLAGE OF, Clerk-Treasurer, 41 Commercial Street, Angola, NY 14006
   2. ALABAMA TOWN OF, Deputy Supervisor, 2218 Judge Road, Oakfield, NY 14125
   3. BENNINGTON TOWN OF, Water System Operator, 134 Clinton Street, Alden, NY 14004
   4. BRANT TOWN OF, Town Clerk, Town Hall, 992 Brant-Farnham Road, Brant, NY 14027
   5. COLDEN TOWN OF, Deputy Town Clerk, Town Hall, S-8812 State Road, Colden, NY 14033
   6. EAST AURORA VILLAGE OF, Village Clerk, 571 Main Street, East Aurora, NY 14052
   7. ELMA TOWN OF, Town Clerk, Town Hall, 1600 Bowen Road, Elma, NY 14059
   8. FARNHAM VILLAGE OF, Village Clerk-Treasurer, 526 Commercial Street, Farnham, NY 14061
   9. HANOVER TOWN OF, Town Clerk, 68 Hanover Street, Silver Creek, NY 14136
   10. ORCHARD PARK VILLAGE OF, Clerk-Treasurer, 4295 South Buffalo Road, Orchard Park, NY 14127

11. SILVER CREEK VILLAGE OF, Village Clerk, 172 Central Avenue, Silver Creek, NY 14136”

END OF SUPPLEMENTARY CONDITIONS

SECTION 011000

SUMMARY OF WORK

PART 1 - GENERAL

1.01 LOCATION AND SCOPE OF WORK

A. The Work consists of construction of a pump station within the Newstead Water Storage Tank, including pumps, VFD's, emergency generator, new valves and piping and other appurtenances to make a complete installation. Coordination with National Grid and National Fuel gas will be required for the upgrade of the existing electric service and installation of a new natural gas service to the water tower.

B. The Work is located in the Town of Newstead, in Erie County, New York.

C. The summary of the Work described in the Section 011000 is an overall summary of the responsibilities of the CONTRACTOR and their relation to the OWNER. It does not supersede the specific requirements of the other Contract Documents.

1.02 CONTRACTS

A. The Work shall be constructed under one prime contract.

1.03 WORK BY OTHERS

A. Work by OWNER:
   1. The Authority will operate all utility water system valves and hydrants of existing watermains and of newly installed watermains once placed into service.

1.04 NOT USED

1.05 NOT USED

1.06 SEQUENCE OF WORK

A. General
   1. The Work generally shall be constructed without disruption to the normal operation of the Authority, except as noted in Section 011416, and 017000, and as otherwise approved by the OWNER.
   2. It is hereby understood that Time is of Essence in performing all work, but especially in the time that service is interrupted to the customer.
   3. The sequence of work presented is a guide. If the CONTRACTOR proposes adjustments to this sequence, CONTRACTOR shall submit the revised

sequence to the OWNER and ENGINGEER for review and approval prior to proceeding with the proposed adjusted sequence.

4. CONTRACTOR shall coordinate with OWNER with respect to connection locations of temporary piping or temporary pump (provided by OWNER) to allow for installation of the pump station without impacting operation of the water storage tank during construction. CONTRACTOR shall be responsible for fueling of the temporary pump throughout the duration of construction through substantial completion.
5. The construction sequence listed below includes both interior and exterior work to be completed by the contractor. As personnel levels, and equipment and material availability allow, CONTRACTOR may perform interior and exterior work concurrently.

B. Construct the Work in the following sequence:
   1. Complete and submit shop drawings to ENGINEER.
   2. Obtain all necessary permits and submit copies to the ENGINEER.
   3. CONTRACTOR shall begin coordination process with National Grid and National Fuel gas upon receipt of the Notice to Proceed for installation/upgrade of services required for the operation of the proposed pump station and ancillary elements of the work.
   4. Upon approval of the respective shop drawings the CONTRACTOR shall order those elements with an anticipated long lead time for manufacture and delivery and includes but is not limited to pumps, VFDs, emergency generator or other materials that are anticipated to take extensive time to acquire.
   5. CONTRACTOR mobilize to the site, setup temporary facilities (including site trailers, staging and laydown areas, protection of existing facilities, erosion and sedimentation controls, etc.), institute health and safety provisions, and other preconstruction activities.
   6. Install structural elements
   7. CONTRACTOR shall coordinate with OWNER with respect to connection locations of temporary piping or temporary pump (provided by OWNER) to allow for installation of the pump station without impacting operation of the water storage tank during construction. CONTRACTOR shall be responsible for fueling of the temporary pump throughout the duration of construction through substantial completion.
   8. Construct ceiling including steel bar joists and ceiling elements.
   9. CONTRACTOR to coordinate with OWNER to have OWNER open bypass valve at Main Street to allow for the draining of the tank to temporarily remove it from service to allow for pipe removal and installation. rain Tank and temporarily remove it from service. CONTRACTOR shall notify OWNER a minimum of five (5) business days prior to the need for bypass valve operation.
   10. Demolish and remove the valve pit top slab and access hatches.
   11. Remove piping within the valve pit.

12. Install valve and tee on inlet riser and a portion of the new piping in valve pit to allow for temporary piping for tank operation during construction.
13. Install temporary piping and coordinate with OWNER to bring the water storage tank back into operation during construction.
14. Repair concrete at the top of the valve pit and adjacent floor slab.
15. Install remaining new piping, valves and appurtenances, without making final connection to the outlet riser.
16. Install conduit, wiring and incidentals to their termination points.
17. Install VFDs, panels and appurtenances.
18. Install meters, gauges and other devises and make electrical connections.
19. Construct pump support pads within the valve pit.
20. Install pumps and make connections to outlet piping from pumps.
21. Concurrently with piping and pump work, install heating and ventilation elements.
22. Concurrently with piping and pump work, install new insulated roll-up door and new personnel door and reconnect security system to personnel door.
23. Install structural steel framing for grating support and install grating.
24. CONTRACTOR shall coordinate new natural gas service installation with National Fuel Gas. 48 hours prior to installation of new gas service CONTRACTOR shall notify the adjacent property owner of the work to be performed. CONTRACTOR shall maintain access to the adjacent property driveway from the start of service installation through to the final site restoration.
25. CONTRACTOR shall make connections between the new natural gas service and natural gas supply piping of the new heating system.
26. CONTRACTOR shall coordinate service upgrade between National Grid and OWNER. Some preliminary work required as part of the electric service change may be performed by OWNER and National Grid prior to the start of construction. CONTRACTOR shall also coordinate this work.
27. Install the proposed transformer pad, and all component, conduit, and wiring into the tank and connection to proposed equipment.
28. Install the emergency generator and all conduit and wiring to connect to the proposed equipment in the base of the water storage tank. The emergency generator installation will include a concrete support slab and ice fall protection structure.
29. CONTRACTOR shall note that the proposed equipment will not be energized or connected to the new utility service. The existing 120/240V services (OWNER and ECES) and OWNER panel in the tank will remain in use.
30. The CONTRACTOR shall coordinate new electric service work with National Grid and coordinate the change over from the old service to the new service between OWNER, ECES and National Grid. CONTRACTOR shall note that some preliminary work required as part of the electric service change may be performed by OWNER and National Grid prior to the start of construction.

31. Electric work for the proposed equipment, including pumps and motor-controlled valves, etc., will be connected to the proposed electric service. This service will not be energized.
32. Install interior and exterior lighting.
33. CONTRACTOR to coordinate with OWNER to have OWNER open bypass valve at Main Street to allow for the draining of the tank to temporarily remove it from service
34. NGRID will replace the existing utility pole at the road and provide service equipment on the pole for the proposed 3 phase primary service. After the pole is installed, the CONTRACTOR shall:
    a. modify existing conduits at the pole and install a new service riser as field required.
    b. remove the existing transformer pad and connect the proposed primary conduits from the new transformer to the existing primary conduits.
    c. connect the proposed ECES service conduit to the existing ECES conduit and newly installed feeders.
    d. make all the required modification to the ECES service including new meter, service disconnect, and stepdown transformer to provide 120/240V power for connection to existing ECES automatic transfer switch.
35. Following completion of the above National Grid will install new primary feeders, install the new transformer and energize the new service. CONTRACTOR shall coordinate this work with National Grid.
36. CONTRACTOR shall integrate new pump station equipment into OWNER SCADA and PLC elements in coordination with OWNER SCADA subconsultant.
37. CONTRACTOR shall remove temporary piping and make final pipe connections.
38. Relocate existing fire hydrant.
39. Disinfect and test water piping and equipment.
40. CONTRACTOR shall coordinate with OWNER to bring the water storage tank back into service.
41. CONTRACTOR shall coordinate and undertake commissioning of all new equipment and systems in conjunction with the OWNER and their subconsultants. This will include the final integration and testing of the new equipment and systems with the OWNER SCADA system.
42. CONTRACTOR shall make the water storage tank fully operational upon final approval and acceptance by OWNER.
43. Complete site restoration including areas of pavement disturbance and trenching as a result of the new electrical and natural gas service installation.
44. Remove erosion and sedimentation controls.

1.07 CONTRACTOR'S USE OF PREMISES

A. CONTRACTOR'S use of the premises shall be confined to the areas shown.

B. CONTRACTOR must share use of the premises with the OWNER and other contractors specified in Article 1.03.

C. CONTRACTOR shall:
   1. Assume full responsibility for protection and safekeeping of products stored on or off premises.
   2. Move stored products that interfere with the operations of OWNER or other contractor.
   3. Obtain and pay for all additional storage or work areas required for his operations.
   4. Obtain and pay for all permits and satisfy all permit requirements.
   5. Comply with all requirements defined in other specification sections.

D. Limits on CONTRACTOR'S use of site are:
   1. OWNER will designate the area available for field offices and laydown/material storage areas.

E. See General Conditions for additional requirements.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 011310

SCHEDULE OF COMPLETION

PART 1 - GENERAL

1.01 DESCRIPTION

A. CONTRACTOR shall perform the Work to achieve the Contract Times, Milestones, and specified completion requirements.

B. Schedule of Completion describes selected Milestones and completion requirements and is not intended to describe all the Work or its constraints, interrelationships, or sequential requirements.

C. Purpose of Milestones and completion requirements in the Schedule of Completion is to coordinate the Work with the required minimum operations required at OWNER's facility.

1.02 MILESTONES

A. Milestone M1 – Shop Drawing/Submittal – Approved
   1. The General Work for Milestone M1 is the submittal for the four new horizontal split case pumps, variable frequency drives, diesel emergency engine generator, portable load bank system, and automatic transfer switch.
   2. Milestone M1 includes completing all Work shown and specified with providing submittals/resubmittals as necessary to meet OWNER/ENGINEER approval.
   3. Milestone M1 is achieved when the CONTRACTOR provides shop drawings that are approved by OWNER/ENGINEER.

1.03 SCHEDULE OF COMPLETION

A. The Schedule of Completion shall be:

SCHEDULE OF COMPLETION		
General Area of Work	**Activity Associated with Milestone or Completion Requirements**	**Contract Time [(1)]**
Pump and Genset Shop Drawing/Submittal – Approved	Milestone M1	90 Days
Substantial Completion		
Final Completion		

[(1)] From CONTRACTOR Notice to Proceed

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 011416

COORDINATION WITH OWNER'S OPERATIONS

PART 1 - GENERAL

1.01 DESCRIPTION

A. CONTRACTOR shall carry out all operations to avoid interference with the operations of the existing facilities.

B. The CONTRACTOR shall not have exclusive possession of the sites of the work to be done under this contract.

C. In the performance of the work, the CONTRACTOR shall schedule and cooperate fully with the OWNER and other Contractors, affording them facilities for the performance of their work even though it interferes with his own.

D. CONTRACTOR shall provide OWNER five (5) business days notice prior to a required water storage tank shut down.

E. CONTRACTOR shall provide adjacent property owners 48 hours notice prior to the start of work on or along the access drive.

F. Access to the adjacent property to the west of the access drive by way of the access drive shall be maintained throughout the duration of construction.

G. Related Work Specified Elsewhere:
1. Divisions 2-43, Technical Specifications.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 011419

USE OF OWNER'S FACILITIES

PART 1 - GENERAL

1.01 DESCRIPTION

A. CONTRACTOR may use existing facilities or equipment in the new work for construction purposes only if the OWNER'S written permission is obtained.

B. Restore existing facilities and equipment used for temporary purposes to original condition in a manner satisfactory to OWNER.

C. CONTRACTOR shall assume full responsibility for any damage that may result to existing or new facilities or equipment used for construction purposes and shall repair or replace any damaged facilities or equipment at CONTRACTOR'S cost.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 012116

ALLOWANCES

PART 1 - GENERAL

1.01 SCOPE

A. This Section includes administrative and procedural requirements governing the following types of allowances:
   1. Cash allowances.
   2. Contingency allowances.

B. Authorization of Allowances:
   1. Work that will be done and paid under an allowance will be authorized in OWNER'S written instruction to CONTRACTOR.
   2. Do not provide Work under an allowance without written authorization of OWNER.

1.02 CASH ALLOWANCES

A. Cash allowances are stipulated amounts for purchase of products, systems, or services. In addition to this Section, refer to General Conditions, as may be modified by the Supplementary Conditions; and individual Specification Sections for CONTRACTOR'S costs to be covered by allowances, and CONTRACTOR'S costs, including overhead and profit, to be included elsewhere in the Contract Price.

B. At earliest practical date after Notice to Proceed, advise ENGINEER of date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

C. Consult with ENGINEER in selecting suppliers and obtain proposals for price and time from selected suppliers. Submit proposals to ENGINEER along with recommendations relevant to furnishing and installing products covered in the allowance.

D. Purchase products or systems from suppliers selected by ENGINEER.

E. Submit invoices or delivery slips to show actual cost and quantity of products or systems delivered to Site and used in fulfilling each allowance.

F. Properly dispose of unused products and systems purchased under cash allowance.

G. For each allowance, submit to ENGINEER a Change Order proposal to adjust Contract Price for difference between specified allowance amount and actual cost. Prepare Change Order proposal in accordance with General Conditions as may be modified by the Supplementary Conditions, except that payment within limit of a

cash allowance shall exclude cost of bond and insurance premiums. No subcontractor markup is allowed under allowance work.

1.03 CONTINGENCY ALLOWANCE

A. Contingency allowances are stipulated amounts available as reserve for sole use by OWNER to cover unanticipated costs.

B. When authorization of Work under contingency allowance is contemplated by OWNER for a defined scope, submit Change Order proposal to ENGINEER. Prepare Change Order proposal in accordance with the General Conditions as may be modified by the Supplementary Conditions, except that payments within limit of contingency allowance shall exclude cost of bond and insurance premiums.

C. For each allowance, submit to ENGINEER a Change Order proposal to adjust Contract Price for difference between specified allowance amount and actual cost. Prepare Change Order in accordance with General Conditions as may be modified by the Supplementary Conditions, except that payment within limit of a cash allowance shall exclude cost of bond and insurance premiums.

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 SCHEDULE OF ALLOWANCES

A. Cash Allowances:

1. Include an allowance of $15,000 for Bid Item 2A, Cash Allowance for National Grid Work.

2. Include an allowance of $15,000 for Bid Item 2B, Cash Allowance for National Fuel Gas Work.

3. Include an allowance of $XX,XXX for Bid Item 2C, Cash Allowance for PLC and SCADA System Work. Following this specification is Kaman Automation budget proposal for reference.

B. Contingency Allowances: Include a stipulated contingency allowance of $200,000.00 for Bid Item 3A, Contingency Allowance, for use in accordance with the OWNER'S instruction to perform miscellaneous work.

END OF SECTION

SECTION 012213

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A. The items listed below beginning with Article 1.05, refer to and are the same pay items listed in the Bid Form. They constitute all of the pay items for the completion of the Work. No direct or separate payment will be made for providing miscellaneous temporary or accessory works, plant, services, ENGINEER'S and/or CONTRACTOR'S field offices, layout surveys, job signs, sanitary requirements, permits, testing, safety devices, shop drawings and samples, approval and record drawings, water supplies, power, maintaining traffic, removal of waste, watchmen, bonds, insurance, test pits and all other requirements of the General Conditions, Supplementary Conditions, and the General Requirements. Compensation for all such services, things and materials shall be included in the prices stipulated for the lump sum and unit price pay items listed herein.

B. The lump sum bid prices 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.

C. The CONTRACTOR shall furnish all labor, materials, tools, equipment, services, and all appurtenances necessary to perform all work required, at the lump sum prices for the items listed in the Bidder's Proposal. Each bid item shall include all costs to perform all work to complete each item. Work shall include, but is not necessarily limited to clearing and grubbing, earth excavation, rock excavation, disposal of excess excavated material, handling of all water, dewatering, earth backfill, select backfill, conduit bedding piping, service tubing and accessories, saddles, bends, reducers, tees, valves, hydrants, and all other fittings, traffic control, permits, test pits, restoration, connections to existing watermains, testing, and disinfection.

D. Each of the bid items shall also include the cost required in supporting and protecting existing utilities while working under, over, or alongside or near the utility.
   1. The cost of repairing any damage to the various utilities done during the installation of the work shall be included in the various bid items.

1.02 RELATED PROVISIONS

A. Payments to CONTRACTOR: Refer to General Conditions and Agreement.

B. Changes in Contract Price: General Conditions.

C. Summary of Work: Section 011000.

D. Schedule of Values: Section 012973.

1.03 BID ITEMS

A. ITEM 1A – PUMP STATION

1. Work Included:

a. This item includes all labor, materials, equipment, sampling and testing, and incidentals required to furnish and install the pump station and building modifications described in Section 011000, Summary of Work and shown on the drawings and specified herein, except that specifically included under other items of the Contract.

b. This item includes all work within the base of the elevated water tank to a limit of five (5) feet from the exterior face of the water tank base and including but not limited to ductile iron pipe, fittings and appurtenances, valves and appurtenances, pipe supports, instrumentation, pumps, concrete, structural steel, steel bar joists, steel grating and railings and associated appurtenances, heating and ventilation equipment, controls and appurtenances, electrical wiring, conduit and appurtenances, interior and exterior lighting, rollup and personnel doors and appurtenances, temporary pumps or piping, reconnection of existing security system, pipe flushing, testing and disinfection, and all other materials and requirements not specifically defined in other bid items.

c. This item includes all labor, materials, equipment, testing, and incidentals to connect the new electrical and natural gas services to the new and existing equipment requiring connections.

d. This item includes maintenance of continuous electric power to the 911 notification system operating in the base of the water storage tank.

e. This item includes all testing, startup and placing into operation all systems and equipment for the new pump station, electrical systems, and heating and ventilation system elements of the work.

f. This item includes the installation and removal of all temporary sampling points at diameters necessary for proper testing.

2. Measurement:

a. The lump sum price for Pump Station reflects the actual value of the work involved. The quantity to be paid for under this Item will be made on a lump sum basis in proportion to the amount of Work completed.

3. Payment:

a. Payment for the work on the pump station will be made at the GENERAL CONTRACTOR's bid, as stated in the bid. The amount bid shall be made payable to the GENERAL CONTRACTOR whenever he shall have completed five percent (5%) of the Contract work. Five percent (5%) of the work shall be considered completed when the total of payments earned, as reflected by estimates of work done, not including the amount bid for this item, nor payments for materials delivered to the site, exceeds five percent (5%) of the total amount of the bid for this Contract. The lump sum price bid for this Item shall be full compensation as shown and specified.

B. ITEM 1B – NEW EMERGENCY GENERATOR AND TRANSFORMER

1. Work Included:

a. This item includes all labor, materials, equipment, testing, and incidentals required to furnish and install the emergency generator and emergency generator protection structure, transformer pad, electrical conduit and wiring, site elements and restoration described in Section 011000, Summary of Work and shown on the drawings and specified herein, except that specifically included under other items of the Contract.

b. This item includes all work outside the base of the elevated water tank from a point five (5) feet from the exterior face of the elevated water tank base including, furnishing and installing the emergency generator, emergency generator support pad, emergency generator support structure, transformer support pad, underground and aboveground conduit and wiring, electrical appurtenances, new asphalt pavement, relocation of existing hydrant and associated pipe, fittings, valves and appurtenances, stormwater pollution prevention controls, restoration of disturbed pavement and grass areas, pipe flushing, testing and disinfection, and all other materials and requirements not specifically defined in other bid items.

c. This item includes all excavation required and the furnishing and installing of earth or select backfill to complete the relocation of the existing hydrant.

d. This item includes concrete blocking, washed No. 1 stone for weep hole drainage, and earth backfill as required for the relocation of the existing hydrant.

e. This item includes all excavation and backfill required for the installation of the concrete transformer pad, concrete emergency generator pad, and emergency generator protection structure concrete foundations.

f. This item includes the installation and removal of all temporary sampling points at diameters necessary for proper testing of the new and existing piping for relocated hydrant.

g. This item includes removal of the existing transformer pad and associated conduit and restoration of this area.

h. This item includes temporary maintenance of access to adjacent property during installation of the new natural gas service and through the completion of permanent restoration.

i. This item includes connection of the new electrical service to the existing 911 notification system.

j. This item includes all labor, materials, equipment, testing, and incidentals to connect the new electrical and natural gas services to the new and existing equipment requiring connections.

k. This item includes all coordination and permitting requirements for the new electric and natural gas services being installed by National Grid and National Fuel Gas, respectively.

l. This item includes all testing, startup and placing into operation all systems and equipment for the new emergency generator, electrical systems, and transformer connections to the emergency generator.

m. l. Select backfill and permanent restoration is included under this item.

2. Measurement:

a. The lump sum price for New Emergency Generator and Transformer reflects the actual value of the work involved. The quantity to be paid for under this Item will be made on a lump sum basis in proportion to the amount of Work completed.

3. Payment:

a. Payment for the work on the pump station will be made at the GENERAL CONTRACTOR's bid, as stated in the bid. The amount bid shall be made payable to the GENERAL CONTRACTOR whenever he shall have completed five percent (5%) of the Contract work. Five percent (5%) of the work shall be considered completed when the total of payments earned, as reflected by estimates of work done, not including the amount bid for this item, nor payments for materials delivered to the site, exceeds five percent (5%) of the total amount of the bid for this Contract. The lump sum price bid for this Item shall be full compensation as shown and specified.

C. ITEM 2A – CASH ALLOWANCE FOR NATIONAL GRID WORK

1. Work Included:

a. This allowance is to cover the cost of work by National Grid for a new electric service at the Newstead Water Storage Tank.

2. Payment:
    a. The GENERAL CONTRACTOR will only receive payment under this item for the actual cost from National Grid to complete their required work.

D. ITEM 2B – CASH ALLOWANCE FOR NATIONAL FUEL GAS WORK
1. Work Included:
    a. This allowance is to cover the cost of work by National Fuel Gas for a new natural gas service at the Newstead Water Storage Tank.
2. Payment:
    a. The GENERAL CONTRACTOR will only receive payment under this item for the actual cost from National Fuel Gas to complete their required work.

E. ITEM 2C – CASH ALLOWANCE FOR PLC AND SCADA SYSTEM WORK
1. Work Included:
    a. This allowance is to cover the cost of work by OWNER system integrator Kaman Automation to modify existing RTU panel and related PLC and SCADA system work to OWNER for the Newstead Water Storage Tank Pump Station.
2. Payment:
    a. The GENERAL CONTRACTOR will only receive payment under this Item for actual extra Work performed as approved in writing and directed by the ENGINEER and may not receive all or part of the total amount of this Item if the value of this extra Work is less than the allowance value.

F. ITEM 3 – CONTINGENCY ALLOWANCE
1. Work included:
    a. Section 01210, Allowances, includes a stipulated amount available as reserve for sole use by OWNER to cover anticipated costs.
2. Measurement:
    a. OWNER shall authorize contingency allowances for required work not covered in other bid items and as specified or directed by ENGINEER.
3. Payment:
    a. Payment for Work authorized under Item 3 will be full compensation for providing all Work authorized under the contingency allowance, complete as specified or directed by ENGINEER. Work authorized under contingency allowance will be included in subsequent Application(s) for Payment, as applicable, following authorization and performance for contingency allowance Work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 012513

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Requests for review of a substitution shall conform to the requirements of the General Conditions and shall contain complete data substantiating compliance of proposed substitution with Contract Documents.

1.02 CONTRACTOR'S OPTIONS

A. For materials or equipment (hereinafter products) specified only by reference standard, select product meeting that standard, by any manufacturer, fabricator, supplier or distributor (hereinafter manufacturer). To the maximum extent possible, provide products of the same generic kind from a single source.

B. For products specified by naming several products or manufacturers, select any one of the products or manufacturers named which complies with Specifications.

C. For products specified by naming one or more products or manufacturers and stating "or equal", submit a request for a substitution for any product or manufacturer which is not specifically named.

D. For products specified by naming only one product or manufacturer and followed by words indicating that no substitution is permitted, there is no option and no substitution will be allowed.

E. Where more than one choice is available as a CONTRACTOR'S option, select product which is compatible with other products already selected or specified.

1.03 SUBSTITUTIONS

A. During a period of 30 days after date of commencement of Contract Time, ENGINEER will consider written requests from CONTRACTOR for substitution of products or manufacturers, and construction methods (if specified).
   1. After end of specified period, requests will be considered only in case of unavailability of product or other conditions beyond control of CONTRACTOR.

B. Submit 5 copies of request for substitution. Submit separate request for each substitution. In addition to requirements set forth in Article 6.05 of General Conditions, include in request the following:

1. For products or manufacturers:
    a. Product identification, including manufacturer's name and address.
    b. Manufacturer's literature with product description, performance and test data, and reference standards.
    c. Samples, if appropriate.
    d. Name and address of similar projects on which product was used, and date of installation.
2. For construction methods (if specified):
    a. Detailed description of proposed method.
    b. Drawings illustrating method.
3. Such other data as the ENGINEER may require to establish that the proposed substitution is equal to the product, manufacturer or method specified.

C. In making request for substitution, CONTRACTOR represents that:
1. CONTRACTOR has investigated proposed substitution, and determined that it is equal to or superior in all respects to the product, manufacturer or method specified.
2. CONTRACTOR will provide the same or better guarantees or warranties for proposed substitution as for product, manufacturer or method specified.
3. CONTRACTOR waives all claims for additional costs or extension of time related to proposed substitution that subsequently may become apparent.

D. A proposed substitution will not be accepted if:
1. Acceptance will require changes in the design concept or a substantial revision of the Contract Documents.
2. It will delay completion of the Work, or the work of other contractors.
3. It is indicated or implied on a Shop Drawing and is not accompanied by a formal request for substitution from CONTRACTOR.

E. If the ENGINEER determines that a proposed substitute is not equal to that specified, CONTRACTOR shall furnish the product, manufacturer or method specified at no additional cost to OWNER.

F. Approval of a substitution will not relieve CONTRACTOR from the requirement for submission of Shop Drawings as set forth in the Contract Documents.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 012973

SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Schedule of Values is an itemized list that establishes the value or cost of each part of the Work. It shall be used as the basis for preparing progress payments and may be used as a basis for negotiations concerning additional work or credits, which may arise during the construction. Quantities and unit prices may be included in the schedule when approved by or required by the ENGINEER.

1.02 PREPARATION

A. Schedule shall show breakdown of labor, materials, equipment, and other costs used in preparation of the Bid.

B. Costs shall be in sufficient detail to indicate separate amounts for each Section of the Specifications.

C. CONTRACTOR may include an item for bond, insurance, temporary facilities and job mobilization on lump sum project only. This item will be included for payment at a rate of 25 percent per month for the first four months.

D. Schedule of Values shall be prepared on 8-½-inch by 11-inch white paper.

E. Use Table of Contents of the Specifications as basis for Schedule format and identify each item with number and title in the Table of Contents. List sub-items of major products or systems as appropriate or when requested by ENGINEER.

F. When requested by ENGINEER, support values with data that will substantiate their correctness.

G. The sum of the individual values shown on the Schedule of Values must equal the total Contract Price.

H. Each item shall include a directly proportional amount of the CONTRACTOR'S overhead and profit.

I. Schedule shall show the purchase and delivery costs for materials and equipment that the CONTRACTOR anticipates he shall request payment for prior to their installation.

J. Included in the detailed breakdown shall be a line item for “record documents”. This amount is for preparing and supplying required information and documentation as described in Section 017213.16, Survey Data.

1.03 SUBMITTAL

A. Submit two copies of Schedule to ENGINEER for approval at least 20 days prior to submitting first application for a progress payment but no later than 10 days after date of execution of agreement. After review by ENGINEER, revise and resubmit Schedule as required until it is approved.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 013113

PROJECT COORDINATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. As more fully set forth in Article 6 of the General Conditions, CONTRACTOR shall be solely responsible for coordination of all of the Work. He shall supervise, direct and cooperate fully with all Subcontractors, manufacturers, fabricators, suppliers, distributors, installers, testing agencies and all others whose services, materials or equipment are required to ensure completion of the Work within the Contract Time.

B. As more fully set forth in Article 7 of the General Conditions, CONTRACTOR shall cooperate with and coordinate his Work with the work of any other contractor, utility service company or OWNER'S employees performing additional work related to the Project at the site.

C. CONTRACTOR shall not be responsible for damage done by contractors not under his jurisdiction. He will not be liable for any such loss or damage unless it is through the negligence of CONTRACTOR.

D. CONTRACTOR shall maintain sufficient competent personnel, drafting equipment and supplies at the site for the purpose of preparing layout and coordination drawings. These drawings shall supplement the contract documents, and the Shop Drawings, as necessary to correlate the work of various trades. Where such drawings are to be prepared by the mechanical, electrical, or plumbing Subcontractors, CONTRACTOR will ensure that each Subcontractor maintains the required personnel and facilities at the site.

E. CONTRACTOR shall also coordinate his Work with the work of others to assure compliance with schedules.

F. CONTRACTOR shall attend and participate in all project coordination or progress meetings and report on the progress of all Work and compliance with schedules.

PART 2 - PRODUCT (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 013119.13

PRECONSTRUCTION CONFERENCE

PART 1 - GENERAL

1.01 DESCRIPTION

A. Date, Time, and Location: Conference will be held after execution of the Agreement and before construction is started at the site. ENGINEER will fix the date, time and location of the meeting in accordance with the General Conditions.

B. ENGINEER shall prepare agenda, preside at meeting, and prepare and distribute a transcript of proceedings to all parties.

C. CONTRACTOR(S) shall provide data required, contribute appropriate items for discussion, and be prepared to discuss all items on agenda.

D. CONTRACTOR shall prepare and distribute a preliminary construction schedule.

1.02 REQUIRED ATTENDANCE

A. CONTRACTOR(S) and major Subcontractors.

B. OWNER'S representative.

C. ENGINEER.

D. Representatives of governmental agencies and fire departments having any degree of control or responsibility, if available.

1.03 AGENDA

A. Agenda will include, but will not necessarily be limited to, the following:
   1. Designation of responsible personnel.
   2. Subcontractors.
   3. Coordination with other contractors.
   4. Construction schedule.
   5. Review preliminary construction schedule.
   6. Processing of Shop Drawings.
   7. Schedule of Shop Drawing submittals.
   8. Processing of Field Orders and Change Orders.
   9. Requirements for copies of Contract Documents.
   10. Insurance in force.
   11. Schedule of Values.
   12. Processing of progress payments.

13. Cash flow.
14. Use of premises.
15. CONTRACTOR(S) responsibility for safety and first aid procedures.
16. Security.
17. Housekeeping.
18. Field Offices.
19. Record Drawings.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 013119.23

PROGRESS MEETINGS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Date and Time:
   1. Regular bi-weekly meetings: As mutually agreed upon by OWNER, ENGINEER, and CONTRACTOR.
   2. Other Meetings: On call.
   3. Final Inspection on project completion.

B. Place: ENGINEER'S field office or OWNER'S Conference Room office at Project site or other mutually agreed upon location.

C. ENGINEER shall prepare agenda, preside at meetings, and prepare and distribute a transcript of proceedings to all parties.

D. CONTRACTOR shall provide data required and be prepared to discuss all items on agenda.

1.02 MINIMUM ATTENDANCE

A. CONTRACTOR:
   1. When needed for the discussion of a particular agenda item, CONTRACTOR shall require representatives of Subcontractors or suppliers to attend a meeting.

B. ENGINEER.

C. OWNER'S representative, if required.

D. Others as appropriate.

E. Representatives present for each party shall be authorized to act on their behalf.

1.03 AGENDA

A. Agenda will include, but will not necessarily be limited to, the following:
   1. Transcript of previous meeting.
   2. Progress since last meeting.
   3. Planned progress for next period.
   4. Problems, conflicts and observations.
   5. Change Orders.

6. Status of Shop Drawings.
7. Quality standards and control.
8. Schedules, including off-site fabrication and delivery schedules. Corrective measures, if required.
9. Coordination between parties.
10. Safety concerns.
11. Other business.

1.04 FINAL INSPECTION

A. A Final Inspection shall not be scheduled until the ENGINEER is satisfied that all requirements of the contract have been met and the Work is acceptable.

B. ENGINEER shall schedule final inspection at least 72 hours in advance, and shall notify CONTRACTOR and OWNER.

C. The ENGINEER, OWNER and CONTRACTOR shall be present during the final inspection.

D. CONTRACTOR shall provide sufficient manpower during final inspection.

E. CONTRACTOR shall furnish necessary equipment to demonstrate the new Work; including for new watermain, all new pipeline, hydrants, valves, curb stops, etc., to ENGINEER and OWNER for approval.

F. ENGINEER shall itemize deficiencies and provide list to OWNER and CONTRACTOR.

G. CONTRACTOR shall rectify any items identified by ENGINEER prior to final payment.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 013130

EMERGENCY TELEPHONE NUMBERS

PART 1 - GENERAL

1.01 EMERGENCY TELEPHONE NUMBERS

A. The CONTRACTOR shall, at the CONTRACTOR'S expense, furnish to the ENGINEER an emergency phone number list for 24-hour contact during the construction period. Include numbers for office phones, pagers, and cellular phones, as applicable.

B. The list should include, but not be limited to:
1. CONTRACTOR'S office representative,
2. CONTRACTOR'S field superintendent,
3. CONTRACTOR'S foreman,
4. OWNER'S main office,
5. OWNER'S 24 hour emergency number,
6. The Authority's main office,
7. The Authority's 24-hour emergency number,
8. PROJECT ENGINEER,
9. PROJECT INSPECTOR,
10. Utility companies such as gas, water, sewer, oil, telephone, cable, TV, etc.,
11. Highway Departments,
12. Fire Departments serving the project limits,
13. Police Emergency number,
14. New York State Department of Environmental Conservation (NYSDEC) Spill Response Hotline,
15. Other involved agencies.

C. CONTRACTOR shall add names and numbers given to him by ENGINEER and resubmit to ENGINEER as requested.

D. Emergency phone list must be submitted and considered acceptable to ENGINEER and OWNER prior to the start of construction.

E. Phone list must be neatly typed or word processed and submitted on 8-½ x 11 inch paper.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 013216

CONSTRUCTION SCHEDULES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide construction schedule, which conforms to the requirements below, unless otherwise approved by ENGINEER.

B. Update schedules every month and for progress meetings unless otherwise specified or directed by ENGINEER.

C. Submit cash flow schedule with each updated construction schedule.

1.02 CONTENT

A. Shop Drawing submittal dates and required approval dates.

B. Product delivery dates.

C. Factory and field testing dates.

D. Dates for beginning and completing each phase of the Work by activity and by trades.

E. Cash flow schedule shall be based on monthly cash flow.

1.03 FORMAT

A. Schedule will be created on computer using Microsoft Project, latest version.

B. Type: Horizontal bar chart.

C. Sheet Size: 8-½" x 11".

D. Time Scale: Indicate first date in each work week.

E. Organization:
   1. Group Shop Drawing submittals and reviews into a separate subschedule.
   2. Group product deliveries into a separate subschedule.
   3. Group construction work into a separate subschedule by activity.
   4. Group critical activities which dictate the rate of progress into a separate subschedule.
   5. Organize each subschedule by Specification Section number.

F. Activity Designations: Show title and related Specification Section number.

G. Provide electronic copies of project schedule to ENGINEER on one (1) flash drive as requested.

1.04 SUBMITTALS

A. Submit initial schedule at least 20 days prior to submitting first application for a progress payment but no later than 10 days after date of execution of Agreement. Subsequent schedule updates shall be submitted concurrently with monthly payment applications.

B. Submit updated schedules at progress meetings. If a schedule remains unchanged from one period to the next, submit a written notice to that effect. Updated schedules shall show progress completed to date.

C. Make submittals to ENGINEER, three copies of all requirements.

D. Unless otherwise specified, submit four sepia copies of each schedule and one (1) flash drive. One copy each will be reviewed by the OWNER and ENGINEER and returned. The other copy will be retained by the ENGINEER.

E. Attach a letter of transmittal to each submittal and include the following information in the letter:
   1. A listing of items which have changed since the last submittal.
   2. Discussion of problems causing delays, anticipated length of delays, and proposed countermeasures.

F. Submit updated cash flow schedule based on each updated schedule.

G. Payment of partial estimates shall not be made unless the CONTRACTOR has, in force, an approved construction schedule.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 013233

CONSTRUCTION PHOTOGRAPHS

PART 1 – GENERAL

1.01 DESCRIPTION

A. CONTRACTOR shall utilize a qualified individual to take all photographs.

B. For outside construction projects, take photographs during the day in good weather with sufficient ambient light. For night-time outside work, or for inside construction work, use a flash as necessary to compensate for low-light conditions.

C. All photographs taken are to be in color.

1.02 DIGITAL PHOTOS

A. If acceptable to OWNER and ENGINEER, CONTRACTOR shall provide digital, color photographs having a minimum resolution of 12 megapixels each.

B. CONTRACTOR shall furnish one (1) flash drive with each photograph in JPEG (Joint Photographic Experts Group) format and project title identified.

C. Filenames of digital photographs will be the project number followed by date and by either a sequential number or description of view.

D. A log will be included identifying for each photo:
1. Filename.
2. Date photograph was taken.
3. Description of view shown in photograph.
4. Name of photographer.

1.03 PRE-CONSTRUCTION PHOTOGRAPHS

A. CONTRACTOR shall be responsible for taking a sufficient number of preconstruction photographs so as to resolve any disputes which may arise regarding the conditions prior to and subsequent to construction.

B. If a dispute arises where no preconstruction photographs were taken, the disputed area shall be restored by the CONTRACTOR to the extent directed by the ENGINEER and to the complete satisfaction of the ENGINEER, at no additional cost to the OWNER.

C. The CONTRACTOR must provide one full set of preconstruction photographs electronically to both the ENGINEER and OWNER and be prepared to share files with other parties as necessary.

D. The ENGINEER may, at his option, take additional preconstruction photographs which may be used to settle disputes, but he will not be required to make these photographs available to the CONTRACTOR.

E. Preconstruction photographs taken by the CONTRACTOR will not be considered as part of the required number of construction photographs required in Paragraphs 1.04 or 1.05 below.

1.04 CONSTRUCTION PHOTOGRAPHS

A. Take a minimum of ten (10) color photographs each week during the construction period.

B. Photographs shall be taken periodically and as requested by the ENGINEER.

C. A minimum of three (3) photographs shall be taken for each interconnection and abandonment at differing viewing angles and prior to backfilling, showing the pipe connections established.

D. For projects which involve the installation of Prestressed Concrete Cylinder Pipe (PCCP) 24-inches in diameter and greater, CONTRACTOR shall label each pipe segment per the laying schedule with paint and take photos of each pipe segment (on both sides) after installation and prior to backfilling. The pipe label shall be visible in the photographs taken.

1.05 POST-CONSTRUCTION PHOTOGRAPHS

A. CONTRACTOR shall take photographs of the project site and work areas identifying final site conditions, including final paving, landscape restoration, flush hydrant locations, pump station improvements, anode testing station locations, and any other views requested by the ENGINEER or OWNER.

B. A minimum of twenty-five (25) post-construction photographs are to be taken detailing the full limits of the project area.

1.06 PRINTS

A. If requested by ENGINEER or OWNER, furnish two (2) prints of each photograph to the ENGINEER within 5 business days of the request.

B. Furnish additional photographs or prints requested by ENGINEER or OWNER at cost.

C. Provide high quality 5-inch by 7-inch standard weight prints with a glossy finish.

D. Place the following information on the back of each print:
   1. Date photograph was taken.
   2. Title of Project.
   3. Description of view shown in photograph.
   4. Name and address of photographer.
   5. Photographer's numbered identification of exposure.

1.07 VIDEO

A. CONTRACTOR shall be responsible for taking video, which includes all areas of construction, so as to resolve any disputes which may arise regarding the conditions prior to and after the construction is complete.

B. Provide one (1) flash drive of the construction area both prior to and post construction. Each video must be a minimum of 15 minutes long with verbal narration while walking the project site to depict the existing or new condition of all areas affected by the construction.

C. For outside construction projects, take videos during the day in good weather with sufficient ambient light.

D. Videos to be submitted as AVI files or other format pre-approved by the OWNER.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 013300

SHOP DRAWING PROCEDURES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Shop Drawing procedures shall conform to requirements of General Conditions and as described in this Section.

1.02 PROCEDURE

A. Submittals of Shop Drawings shall be made to the ENGINEER at the address listed in the Notice to Bidders.

B. A letter of transmittal shall accompany each submittal. If data for more than one Section of the Specifications is submitted, a separate transmittal letter shall accompany the data submitted for each Section.

C. Copies of submittals shall be sent to the ERIE COUNTY WATER AUTHORITY at the Service Center Address at 3030 Union Road, Cheektowaga, New York 14227 and OWNER at the time CONTRACTOR submits to ENGINEER.

D. At the beginning of each letter of transmittal provide a reference heading indicating the following:

1. OWNER'S Name _____

2. Project Name _____

3. Contract No. _____

4. Transmittal No. _____

5. Section No. _____

E. If a Shop Drawing deviates from the requirements of the Contract Documents, CONTRACTOR shall specifically note each variation in his letter of transmittal.

F. All Shop Drawings submitted for approval shall have a title block with complete identifying information satisfactory to ENGINEER.

G. All Shop Drawings submitted shall bear the stamp of approval and signature of CONTRACTOR as evidence that they have been reviewed by CONTRACTOR. Submittals without this stamp of approval will not be reviewed by ENGINEER

and will be returned to CONTRACTOR. CONTRACTOR'S stamp shall contain the following minimum information:

Project Name: _____

CONTRACTOR'S Name: _____

Date: _____

----------Reference----------

Item: _____

Specifications:

Section: _____

Page No.: _____

Para. No.: _____

Drawing No.: _____ of _____

Location: _____

Submittal No.: _____

Approved By: _____

H. A number shall be assigned to each submittal by CONTRACTOR starting with No. 1 and thence numbered consecutively. Resubmittals shall be identified by the original submittal number followed by the suffix "A" for the first resubmittal, the suffix "B" for the second resubmittal, etc.

I. The CONTRACTOR shall initially submit to ENGINEER a minimum of 4 copies of all submittals that are on 8-½-inch by 11-inch or smaller sheets, and one unfolded sepia and 2 prints made from that sepia for all submittals on sheets larger than 8-½-inch by 11-inch. The OWNER and ENGINEER shall receive one copy only of each submittals which will be stamped "Preliminary - Not For Construction."

J. After ENGINEER completes his review, Shop Drawings will be marked with one of the following notations:
   1. Approved.
   2. Approved as Corrected.
   3. Revise and Resubmit.
   4. Not Approved.

5. Submitted for Information.

K. If a submittal is acceptable, it will be marked "Approved" or "Approved as Corrected". Four prints or copies of the submittal will be returned to CONTRACTOR.

L. Upon return of a submittal marked "Approved" or "Approved as Corrected", CONTRACTOR may order, ship or fabricate the materials included on the submittal, provided it is in accordance with the corrections indicated.

M. If a Shop Drawing marked "Approved as Corrected" has extensive corrections or corrections affecting other drawings or Work, ENGINEER may require that CONTRACTOR make the corrections indicated thereon and resubmit the Shop Drawings for record purposes. Such drawings will have the notation, "Approved as Corrected - Resubmit."

N. If a submittal is unacceptable, 2 copies will be returned to CONTRACTOR with one of the following notations:
1. "Revise and Resubmit"
2. "Not Approved"

O. Upon return of a submittal marked "Revise and Resubmit", CONTRACTOR shall make the corrections indicated and repeat the initial approval procedure. The "Not Approved" notation is used to indicate material or equipment that is not acceptable. Upon return of a submittal so marked, CONTRACTOR shall repeat the initial approval procedure utilizing acceptable material or equipment.

P. Any related Work performed or equipment installed without an "Approved" or "Approved as Corrected" Shop Drawing will be at the sole responsibility of the CONTRACTOR.

Q. Shop Drawings shall be submitted well in advance of the need for the material or equipment for construction and with ample allowance for the time required to make delivery of material or equipment after data covering such is approved. CONTRACTOR shall assume the risk for all materials or equipment, which are fabricated or delivered prior to the approval of Shop Drawings. Materials or equipment will not be included in periodic progress payments until approval thereof has been obtained in the specified manner.

R. ENGINEER will review and process all submittals promptly, but a reasonable time should be allowed for this, for the Shop Drawings being revised and resubmitted, and for time required to return the approved Shop Drawings to CONTRACTOR.

S. It is CONTRACTOR'S responsibility to review submittals made by his suppliers and Subcontractors before transmitting them to ENGINEER to assure proper

coordination of the Work and to determine that each submittal is in accordance with his desires and that there is sufficient information about materials and equipment for ENGINEER to determine compliance with the Contract Documents. Incomplete or inadequate submittals will be returned for revision without review.

T. CONTRACTOR shall furnish required submittals with complete information and accuracy in order to achieve required approval of an item within three submittals. All costs to ENGINEER involved with subsequent submittals of Shop Drawings, Samples or other items requiring approval, will be backcharged to CONTRACTOR, at the rate of 3.0 times direct technical labor cost, by deducting such costs from payments due CONTRACTOR for Work completed. In the event that CONTRACTOR requests a substitution for a previously approved item, all of ENGINEER'S costs in the reviewing and approval of the substitution will be backcharged to CONTRACTOR unless the need for such substitution is beyond the control of CONTRACTOR.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 013300.13

SAMPLES

PART 1 - GENERAL

1.01 DESCRIPTION

A. The submittal of Samples shall conform to the requirements of the General Conditions and to procedures described in the Section.

B. Samples and Shop Drawings which are related to the same unit of Work or Specification Section shall be submitted at the same time. If related Shop Drawings and Samples are submitted at different times, they cannot be reviewed until both are furnished to the ENGINEER.

1.02 PROCEDURE

A. CONTRACTOR shall review, approve and submit all Samples promptly. Samples shall be identified with correct reference to Specification Section, page, article and paragraph number, the Drawing No. when applicable. Samples shall clearly illustrate functional characteristics of the product and all related parts and attachments, and full range of color, texture, pattern and material. Samples shall be furnished so as not to delay fabrication, allowing the ENGINEER reasonable time for the consideration of the Samples submitted.

B. CONTRACTOR shall submit at least two Samples of each item required for the ENGINEER'S approval. Submission of Samples shall conform to all applicable provisions under Shop Drawing Submittal and Correspondence procedure. One of the Samples shall be delivered to the ENGINEER'S main office unless otherwise authorized by the ENGINEER. One Sample shall be delivered to the ENGINEER'S field office. If the CONTRACTOR requires a Sample for his use he shall notify the ENGINEER in writing.

C. The CONTRACTOR shall make all corrections required and shall resubmit the required number of new Samples until acceptable to the ENGINEER.

1.03 SAMPLES FOR TESTS

A. CONTRACTOR shall furnish such Samples of material as may be required for examination and test. All Samples of materials for tests shall be taken according to standard methods and as required by the Contract Documents.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 014000

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Quality control.

B. Tolerances.

C. References.

D. Labeling.

E. Mockup requirements.

F. Testing and inspection services.

G. Manufacturers' field services.

1.02 QUALITY CONTROL

A. Monitor quality control over suppliers, manufacturers, products, services, Site conditions, and workmanship, to produce Work of specified quality.

B. Comply with specified standards as the minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

C. Perform Work using persons qualified to produce required and specified quality.

D. Products, materials, and equipment may be subject to inspection by Engineer and Owner at place of manufacture or fabrication. Such inspections shall not relieve Contractor of complying with requirements of Contract Documents. Costs for these inspections shall be borne by the Contractor. Costs for these inspections shall be borne by the Contractor.

E. Supervise performance of Work in such manner and by such means to ensure that Work, whether completed or in progress, will not be subjected to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

1.03 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' recommended tolerances and tolerance requirements in reference standards. When such tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.04 REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current as of date for receiving Bids except where specific date is established by code.

C. Obtain copies of standards and maintain on Site when required by product Specification Sections.

D. When requirements of indicated reference standards conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

E. Neither contractual relationships, duties, or responsibilities of parties in Contract nor those of Architect/Engineer shall be altered from Contract Documents by mention or inference in reference documents.

1.05 LABELING

A. Attach label from agency approved by authorities having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.

B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label:
   1. Model number.
   2. Serial number.
   3. Performance characteristics.

C. Manufacturer's Nameplates, Trademarks, Logos, and Other Identifying Marks on Products: Not allowed on surfaces exposed to view in public areas, interior or exterior.

1.06 MOCK-UP REQUIREMENTS

A. Tests will be performed under provisions identified in this Section and identified in individual product Specification Sections.

B. Assemble and erect specified or indicated items with specified or indicated attachment and anchorage devices, flashings, seals, and finishes.

C. Accepted mockups shall be comparison standard for remaining Work.

D. Where mockup has been accepted by Engineer and is specified in product Specification Sections to be removed, remove mockup and clear area when directed to do so by Engineer.

1.07 TESTING AND INSPECTION SERVICES

A. Contractor will employ and pay for specified services of an independent firm to perform testing and inspection.

B. Independent firm will perform tests, inspections, and other services specified in individual Specification Sections and as required by Engineer.
   1. Laboratory: Authorized to operate at Project location in State of New York.
   2. Laboratory Staff: Maintain full-time Professional Engineer or specialist on staff to review services.
   3. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to National Bureau of Standards or accepted values of natural physical constants.

C. Testing, inspections, and source quality control may occur on or off Project Site. Perform off-Site testing as required by Engineer or Owner.

D. Reports shall be submitted by independent firm to Engineer, Contractor, and authorities having jurisdiction, indicating observations and results of tests and compliance or noncompliance with Contract Documents.
   1. Submit final report indicating correction of Work previously reported as noncompliant.

E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
   1. Notify Engineer and independent firm 48 hours before expected time for operations requiring services.
   2. Make arrangements with independent firm and pay for additional Samples and tests required for Contractor's use.

F. Employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work according to requirements of Contract Documents.

G. Retesting or re-inspection required because of nonconformance with specified or indicated requirements shall be performed by same independent firm on instructions from Engineer. Payment for retesting or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.

H. Agency Responsibilities:
   1. Test Samples of mixes submitted by Contractor.

2. Provide qualified personnel at Site. Cooperate with Engineer and Contractor in performance of services.
3. Perform indicated sampling and testing of products according to specified standards.
4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
5. Promptly notify Engineer and Contractor of observed irregularities or nonconformance of Work or products.
6. Perform additional tests required by Engineer.
7. Attend preconstruction meetings and progress meetings.

I. Agency Reports: After each test, promptly submit one copy of report to Engineer, Contractor, and authorities having jurisdiction. When requested by Engineer, provide interpretation of test results. Include the following:
1. Date issued.
2. Project title and number.
3. Name of inspector.
4. Date and time of sampling or inspection.
5. Identification of product and Specification Section.
6. Location in Project.
7. Type of inspection or test.
8. Date of test.
9. Results of tests.
10. Conformance with Contract Documents.

J. Limits on Testing Authority:
1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
2. Agency or laboratory may not approve or accept any portion of the Work.
3. Agency or laboratory may not assume duties of Contractor.
4. Agency or laboratory has no authority to stop the Work.

1.08 MANUFACTURER'S FIELD SERVICES

A. When specified in individual Specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe Site conditions, conditions of surfaces and installation, quality of workmanship, startup of equipment, testing, adjusting, and balancing of equipment and commissioning as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Engineer 30 days in advance of required observations. Observer is subject to approval of Engineer.

C. Report observations and Site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.

D. Refer to Section 013300 – Shop Drawing Procedures, "Manufacturer's Field Reports" Article.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION

SECTION 014200

REFERENCE STANDARDS

PART 1 - GENERAL

1.01 DESCRIPTION

A. When a reference standard is specified, comply with requirements and recommendations stated in that standard, except when they are modified by the Contract Documents, or when applicable laws, ordinances, rules, regulations or codes establish stricter standards. The latest provisions of applicable standards shall apply to the Work, unless otherwise specified. Reference standards include, but are not necessarily limited to, the following:

1. American Association of State Highway and Transportation Officials.
2. American Concrete Institute.
3. American Gear Manufacturers Association.
4. American Institute of Steel Construction.
5. American Iron and Steel Institute.
6. American National Standards Institute.
7. American Society of Heating, Refrigerating and Air Conditioning Engineers.
8. American Society of Mechanical Engineers.
9. American Society for Testing and Materials.
10. American Water Works Association.
11. American Welding Society.
12. Concrete Reinforcing Steel Institute.
13. Factory Mutual Research Corporation.
14. Institute of Electrical and Electronics Engineers.
15. National Electrical Manufacturer's Association.
16. Occupational Safety and Health Administration.
17. National Fire Protection Association.
18. Prestressed Concrete Institute.
19. Underwriters' Laboratories, Inc.
20. NSF International.
21. International Organization for Standardization (ISO).
22. SSPC: The Society for Protective Coatings.
23. American Petroleum Institute.
24. NACE International.
25. All other applicable standards listed in the Specifications, and the standards of utility service companies, where applicable.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 014213

ABBREVIATIONS AND SYMBOLS

PART 1 - GENERAL

1.01 ABBREVIATIONS

A. Common abbreviations which may be found in the Specifications are:

alternating current	a-c	foot-pound	ft-lb
ante meridiem	am	gallon	gal
ampere	A	gallons per minute	gpm
average	avg	gallons per second	gps
		gram	g
biochemical oxygen demand	BOD		
brake horsepower	bhp	Hertz	Hz
British thermal unit	Btu	hour	hr
		horsepower	hp
Centigrade	°C		
Company	Co	inch	in.
cubic inch	cu in	inch-pound	in.-lb
cubic foot	cu ft	inside diameter	id
cubic yard	cu yd		
cubic feet per minute	cfm	kilovolt-ampere	kva
cubic feet per second	cfs	kilowatt	kw
		kilowatt-hour	hwhr
decibel	db		
degree Centigrade		linear foot	lin ft
(or Celsius) (say)	20°C	liter	l
degree Fahrenheit (say)	68°F		
diameter	diam	maximum	max
direct current	d-c	mercury	Hg
dollars	$	milligram	mg
		milligrams per liter	mg/l
each	ea	milliliter	ml
efficiency	eff	millimeter	mm
		million gallon	mil
Fahrenheit	EF	million gallons per day	mgd
feet	ft	minimum	min
feet per hour	fph		
feet per minute	fpm	net positive suction head	npsh
feet per second	fps	number	No.
Figure	Fig	National Pipe Threads	NPT
flange	flg		

ounce	oz	specific gravity	sp gr
outside diameter	od	square	sq
		square foot	sq ft
parts per million	ppm	square inch	sq in
post meridiem	pm	square yard	sq yd
pound	lb	standard	std
pounds per square foot	psf	standard cubic feet per minute	scfm
pounds per square inch absolute	psia		
pounds per square inch gage	psig	total dynamic head	tdh
		totally-enclosed-fan-cooled	tefc
revolutions per minute	rpm		
		volt	v
second	sec		

1.02 ORGANIZATION ABBREVIATIONS

A. Abbreviations of organizations which may be used in these Specifications are:

ACS	American Chemical Society
ACI	American Concrete Institute
AGMA	American Gear Manufacturers Association
AIChE	American Institute of Chemical Engineers
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
APHA	American Public Health Association
API	American Petroleum Institute
AREA	American Railway Engineering Association
ASTM	American Society for Testing and Materials
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
AWWA	American Water Works Association
AWS	American Welding Society
CRSI	Concrete Reinforcing Steel Institute
ECWA	Erie County Water Authority
EPA	Environmental Protection Agency
FM	Factory Mutual Research Corporation
HEW	Department of Health, Education and Welfare
HUD	Department of Housing and Urban Development
IEEE	Institute of Electrical and Electronic Engineers
IRI	Industrial Risk Insurance
NAAMM	National Association of Architectural Metal Manufacturers

NACE	NACE International
NARUC	National Association of Railroad and Utilities Commissioners
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NSF	National Sanitation Foundation
OSHA	Occupational Safety and Health Administration
PCI	Precast Concrete Institute
SMACNA	Sheet Metal and Air Conditioning National Association
SSPC	Steel Structures Painting Council
UL	Underwriters' Laboratories, Inc.
USGS	United States Geological Survey
USPHS	United States Public Health Service
WWEMA	Water and Wastewater Equipment Manufacturers Association

1.03 MISCELLANEOUS ABBREVIATIONS

ACP	Asbestos Cement Pipe
DIP	Ductile Iron Pipe
mj	mechanical joint
PCCP	Prestressed Concrete Cylinder Pipe
pe	plain end
PVC	Polyvinyl Chloride Pipe
s	spigot
w/	with

1.04 SYMBOLS

A. Refer to Drawings for symbols used on the Contract Drawings.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 014529

TESTING LABORATORY SERVICES FURNISHED BY CONTRACTOR

PART 1 - GENERAL

1.01 DESCRIPTION

A. CONTRACTOR shall employ and pay for an independent testing laboratory to perform the specified services. Laboratory selected shall be subject to approval by the ENGINEER.

B. Inspection, sampling and testing shall be as specified in the Technical Sections.

1.02 QUALIFICATIONS OF LABORATORY

A. Where applicable, meet "Recommended Requirements for Independent Laboratory Qualification", latest edition, published by American Council of Independent Laboratories and the basic requirements of ASTM E329, Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

B. The laboratory shall be certified by New York State for testing potable water. A NYS ELAP number shall be referenced on all test results.

C. Submit copies of ELAP certificates for all potable water testing.

D. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during most recent tour of inspection; with memorandum of remedies of any deficiencies reported by inspection.

E. Testing Equipment:
   1. Calibrated at maximum 12 month intervals by devices of accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.
   2. Submit copy of certificate of calibration, made by accredited calibration agency.

1.03 LABORATORY DUTIES

A. Cooperate with ENGINEER and provide qualified personnel promptly on notice.

B. Perform specified inspections, sampling and testing of materials and methods of construction; comply with applicable standards; ascertain compliance with requirements of Contract Documents.

C. Promptly notify ENGINEER and CONTRACTOR of irregularities or deficiencies of Work, which are observed during performance of services.

D. Promptly submit 5 copies of reports of inspections and tests to ENGINEER including:
   1. Date issued.
   2. Project title and number.
   3. Testing laboratory name and address.
   4. Name and signature of inspector.
   5. Date of inspection or sampling.
   6. Record of temperature and weather.
   7. Date of test.
   8. Identification of product and Specification Section.
   9. Location in Project.
   10. Type of inspection or test.
   11. Results of tests and observations regarding compliance with Contract Documents.

E. Perform additional tests and services as required to assure compliance with the Contract Documents.

1.04 CONTRACTOR'S COORDINATION WITH LABORATORY

A. Cooperate with laboratory personnel, provide access to Work and to manufacturer's operations.

B. Provide to laboratory, representative samples of materials to be tested, in required quantities.

C. Furnish labor and facilities:
   1. To provide access to Work to be tested.
   2. To obtain and handle samples at the site.
   3. To facilitate inspections and tests.
   4. For laboratory's exclusive use for storage and curing of test samples.
   5. Forms for preparing concrete test beams and cylinders.

D. Notify laboratory and ENGINEER sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests.

E. Arrange with laboratory and pay for, additional samples and tests required for CONTRACTOR'S convenience.

1.05 PRODUCT TEST REPORTS

A. Furnish copies of product test reports where required by the Specifications or requested by ENGINEER.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 014533

SPECIAL INSPECTIONS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Special inspections and structural testing shall be in accordance with Chapter 17 of the latest edition of the Building Code of New York State.

B. The program of special inspection and testing is a quality assurance program intended to ensure that the work is performed in accordance with the Contract Documents.

C. This specification section is intended to inform the CONTRACTOR of the OWNER's quality assurance program and the extent of the CONTRACTOR's responsibilities.

1.02 RELATED SECTIONS

A. Section 014529 – Testing Laboratory Services Furnished by Contractor

B. Section 033000 – Cast-In-Place Concrete

C. Section 051200 – Structural Steel Framing

D. Section 052000 – Metal Joists

E. Section 053000 – Steel Floor Decking

1.03 SCHEDULE OF INSPECTIONS AND TESTS

A. Required inspections and tests include, but are not limited to, those listed in the individual specification sections for the items to be inspected or tested. Special inspections include, but are not limited to:
   1. Concrete testing.
   2. Structural Steel testing.
   3. Metal Joist testing.
   4. Steel Deck testing.
   5. Tests made for the CONTRACTOR's convenience.
   6. Repeat tests required because of the CONTRACTOR's negligence or repeated failure to meet Specification requirements.

1.04 QUALIFICATIONS

A. The Special Inspector, testing laboratory, and individual technicians shall be approved by the ENGINEER and OWNER.

B. The testing laboratory shall maintain a full time licensed professional engineer on staff who shall certify all test reports initiated by the testing laboratory. This ENGINEER shall be in responsible charge of the field and laboratory testing operations.

1.05 SUBMITTALS

A. The Special Inspectors and testing laboratory shall disclose any past or present business relationship or potential conflict of interest with the CONTRACTOR or any of the subcontractors whose work will be inspected or tested.

1.06 PAYMENT

A. The OWNER shall engage and pay for the services of the Special Inspector, agents of the Special Inspector, and testing laboratory.

B. The CONTRACTOR shall be responsible for the cost of any tests made for the CONTRACTOR's convenience and retesting or re-inspection of work, which fails to comply with the requirements of the Contract Documents.

1.07 CONTRACTOR RESPONSIBILITIES

A. The CONTRACTOR shall cooperate with the Special Inspector, his agents, and the testing laboratory so that the special inspections and testing may be performed without hindrance.

B. The CONTRACTOR shall review the "Statement of Special Inspections" and shall be responsible for coordinating and scheduling inspections and tests. The CONTRACTOR shall notify the Special Inspector or testing laboratory at least 48 hours in advance of a required inspection or test.

C. Uninspected work that required inspection may be rejected solely on that basis.

D. The CONTRACTOR shall provide incidental labor and facilities (ladders, scaffolding, lights, safety equipment, etc.) to provide access to the work to be inspected or tested, to obtain and handle samples at the site or at source of products to be tested, to facilitate tests and inspections, storage and curing of test samples.

E. The CONTRACTOR shall keep at the project site the latest set of construction drawings, field sketches, approved shop drawings, and specifications for use by the inspectors and testing technicians.

F. The special inspection program shall in no way relieve the CONTRACTOR of his obligation to perform work in accordance with the requirements of the Contract Documents or from implementing his own quality control program.

G. All work that is to be subjected to special inspections shall first be reviewed by the CONTRACTOR's quality control personnel.

H. The CONTRACTOR shall be solely responsible for construction site safety.

1.08 LIMITS OF AUTHORITY

A. The Special Inspector or testing laboratory may not release, revoke, alter, or enlarge on the requirements of the Contract Documents.

B. The Special Inspector or testing laboratory will not have control over the CONTRACTOR's means and methods of construction.

C. The Special Inspector or testing laboratory shall not be responsible for construction site safety.

D. The Special Inspector or testing laboratory has no authority to stop the work.

1.09 RECORDS AND REPORTS

A. Daily reports shall be prepared of each inspection or test and be submitted daily to the Special Inspector. Reports shall include:
   1. Date of test or inspection.
   2. Name of inspector or technician.
   3. Location of specific areas tested or inspected.
   4. Description of test or inspection and results.
   5. Applicable ASTM standard.
   6. Signature of inspector or technician.

B. Any discrepancies from the Contract Documents shall be reported to the CONTRACTOR. Reports shall document all discrepancies identified and the corrective action taken. If the discrepancies are not corrected immediately, the Special Inspector shall notify the ENGINEER of Record and Building Official and post a list of discrepancies at the project site.

C. At the completion of the work requiring Special Inspections, each inspection agency and testing laboratory shall provide a statement to the Special Inspector that all work was completed in substantial conformance with the Contract Documents and that all appropriate inspections and tests were performed. This statement must itemize any discrepancies that were not corrected or resolved.

1.10 FINAL REPORT OF SPECIAL INSPECTIONS

A. The "Final Report of Special Inspections" shall be completed by the Special Inspector and submitted to the ENGINEER of Record and Building Official prior to the issuance of a Certificate of Use and Occupancy.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 015200

TEMPORARY CONSTRUCTION FACILITIES

PART 1 - GENERAL

1.01 DESCRIPTION

A. CONTRACTOR shall be responsible for all temporary construction facilities required for the Work. CONTRACTOR shall make all arrangements with utility service companies for temporary services and shall pay all costs associated therewith.

B. Temporary construction facilities include:
   1. Water.
   2. Electricity and Lighting.
   3. Telephone.
   4. Heat, Weather Protection and Ventilation.
   5. Fire Protection.
   6. Sanitary and First Aid Facilities.

C. CONTRACTOR shall abide by all rules and regulations of the utility service company, OWNER or authority having jurisdiction. CONTRACTOR shall coordinate and schedule all utilization and tie-in work of existing electric, lighting and water service and shall provide OWNER and ENGINEER written notice at least 48 hours before utilizing existing electric, lighting and water service. CONTRACTOR shall carry out all operations to avoid interference with operations of the existing facilities.

D. Sufficient temporary heat and ventilation shall be provided to assure safe working conditions and that no damage will occur to any of the Work.

E. Provide all materials, equipment and power required for temporary electricity and lighting. Include continuous power for construction site offices. Provide all outlets with circuit breaker protection and comply with ground fault protection requirements of NEC. Provide minimum of one 300 watt lamp each 20 feet in work areas.

F. Suitably enclosed chemical or self-contained toilets shall be provided for the use of the men employed on the Work. Toilets shall be located near the Work site and secluded from observation insofar as possible. Toilets shall be serviced at regular intervals, kept clean and supplied throughout the course of the Work.

G. CONTRACTOR shall furnish and maintain a safe drinking water supply readily available to all workers.

H. CONTRACTOR shall be responsible for all utility service costs if constructing a building or facility until the Work is substantially complete. Included are all fuel, power, light, heat and other utility services necessary for execution, completion, testing, and initial operation of the Work.

I. CONTRACTOR shall:
   1. Comply with applicable requirements specified in the Technical Specifications.
   2. Maintain and operate systems to assure continuous service.
   3. Modify and extend systems as Work progress requires.
   4. Completely remove temporary materials and equipment when their use is no longer required.
   5. Clean and repair damage caused by temporary installations or use of temporary facilities.
   6. Restore existing facilities used for temporary services to specified or to original condition.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 015213.13

ENGINEER'S MOBILE FIELD OFFICE

PART 1 - GENERAL

1.01 DESCRIPTION

A. An ENGINEER'S field office structure will not be required for this Contract. In lieu of a field office structure, the CONTRACTOR shall provide the following items:

1. CONTRACTOR shall establish a charge account with a printing/fax/reproducing center with at least two (2) branch locations such as Office Depot, FedEx Office, or approved equal. This account shall be for the use of the ENGINEER for project related services during construction. These services shall include reproduction of specifications, letters, and other applicable 8½" x 11", 8½" x 14", or 11" x 17" material, faxing and receiving faxes, and printing of electronic computer files. ENGINEER shall be provided with a personal card to access the account. The account shall be in service until final completion of the project and shall be for a value not to exceed $500.00.
2. CONTRACTOR shall furnish one (1) cellular smartphone with two (2) rechargeable batteries, battery changing station, and car adapter for a standard cigarette lighter interface. The smartphone shall have internet access, email, and voicemail capabilities. Smartphone shall be for the exclusive use of the ENGINEER and not listed on any shutdown notices to homeowners/businesses.
3. CONTRACTOR shall furnish one (1) digital camera and accessories. Camera shall have a minimum 12 megapixel minimum resolution, 10x minimum zoom range and be equipped with a flash and carrying case. Camera shall be furnished complete with all necessary cables, software, and have at least 16 gigabytes of storage capacity. Camera shall include two (2) sets of rechargeable batteries and battery charging station. Camera shall be for the exclusive use of the ENGINEER.
4. CONTRACTOR shall furnish to the ENGINEER a wireless internet connection for the duration of the project. ENGINEER will provide their own laptop computer. CONTRACTOR shall provide Verizon 4G LTE Jetpack or approved equal. A smartphone configured to provide WiFi service may be used for both telephone and internet service as long as all cables are included.
5. CONTRACTOR shall furnish to the ENGINEER one (1) USB flash drive with minimum capacity of 16 gigabytes.

1.02 PROJECT COMPLETION

A. Remove charge account and cellular phone service upon final acceptance of the Work or when directed by ENGINEER. Smartphone, camera, wireless internet card, flash drive, and all accessories specified herein shall be returned to CONTRACTOR.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 015526

MAINTENANCE AND PROTECTION OF TRAFFIC

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified
The work specified shall include all labor, material, equipment, services and incidentals necessary to maintain and protect vehicular and pedestrian traffic through all construction areas.

B. Related Work Specified Elsewhere
1. Division 2-43, Technical Specifications

1.02 REFERENCES

A. New York State Department of Transportation Standard Specifications, latest revision.

B. Manual f Uniform Traffic Control Devices, latest version with New York State modifications.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. This work shall consist of maintaining traffic and protecting the public from damage to person and property within the limits of and for the duration of the Contract.

B. All existing site roads, streets, sidewalks, and traffic ways shall be kept open for the passage of traffic and pedestrians during the construction period unless otherwise approved by the OWNER, ENGINEER or authority having jurisdiction over same.

C. When required to cross, obstruct or temporarily close a existing site road, street, sidewalk or trafficway, CONTRACTOR shall provide and maintain suitable detours or other approved temporary expedient for the accommodation of traffic. Closings shall be for the shortest time practical, and passage shall be restored immediately after completion of backfill and temporary paving or bridging.

D. CONTRACTOR shall give 48 hours advance notice to the fire and police departments of his proposed operations including temporary shutdowns.

E. CONTRACTOR shall provide signs, signals, barricades, flares, lights and all other equipment, service and personnel required to regulate and protect all traffic, and warn of hazards. All such work shall conform to requirements of the OWNER or authority having jurisdiction. Remove temporary equipment and facilities when no longer required, restore grounds to original, or to specified conditions.

F. Traffic shall be maintained over a reasonably smooth traveled way which shall be so marked by signs, delineators, guiding devices and other methods, that a person who has no knowledge of conditions may safely, and with a minimum of discomfort and inconvenience, ride, drive or walk, day or night, over all or any portion of the street under construction where traffic is to be maintained. All work shall conform to the requirements of the current New York State Manual of Uniform Traffic Control Devices.

G. CONTRACTOR shall control dust and keep the traveled way free from materials spilled from hauling equipment.

H. CONTRACTOR shall provide the necessary traffic control equipment and flagmen for adequate traffic control on the traveled way. Flaggers shall be used where opposing traffic is restricted to one (1) lane or where other conditions require, or as required by permit conditions.

I. CONTRACTOR shall provide ingress and egress to and from intersecting streets, homes, businesses and commercial establishments.

J. CONTRACTOR shall provide adequate protection for pedestrian traffic during all phases of construction.

K. CONTRACTOR shall maintain existing bus stops, if any, so passengers are reasonably accommodated.

L. CONTRACTOR shall make the necessary repairs to existing pavement as required to provide a reasonable smooth traveled way where vehicle operation is maintained.

M. The CONTRACTOR'S responsibility to the public is to protect the public from damage to person and property, which may result directly or indirectly from any construction operation.

N. The CONTRACTOR shall provide temporary markings in accordance with provisions of the New York State Manual of Uniform Traffic Control Devices, as

required by the agency having jurisdiction, as shown in the plans and specifications and/or as ordered by the ENGINEER

O. The CONTRACTOR shall schedule work to keep to a minimum and consistent with the physical requirements of the contract, the amount of existing pavement and/or facilities that are destroyed or substantially torn up at any one time.

P. The CONTRACTOR shall at all times conduct his operations in a manner to insure the convenience of the motorist, the pedestrians and the abutting property owners and their safety as well as the safety of his own employees.

Q. The CONTRACTOR shall furnish, install, move, remove and maintain all signs and barricades and lighting for construction barricades as shown on the plans or as ordered by the ENGINEER, and in accordance with the NYS Manual of Uniform Traffic Control Devices.

R. The CONTRACTOR shall provide and maintain delineation and guiding devices which shall include: delineators, barrels, flashers, railing, temporary curb of any kind, pavement markings, and other similar materials or methods acceptable to the ENGINEER

S. The CONTRACTOR shall construct, move or remove, as directed, temporary structures, approaches, detours, pavements and necessary appurtenances.

T. The CONTRACTOR will be responsible to prepare a maintenance and protection of traffic plan and submit the plan to the ENGINEER for information and the Erie County Highway Department and/or NYS DOT (as required) for approval. The maintenance and protection of traffic plan shall be prepared by an engineer licensed to practice in the State of New York.

3.02 PARKING CONTROL

A. Control all CONTRACTOR related vehicular parking within the limits of the Work to preclude interference with public traffic or parking, access by emergency vehicles, OWNER'S operations, or construction operations. Provide temporary parking facilities as may be required because of construction or operations.

B. Monitor parking of all construction and private vehicles:
1. Maintain free vehicular access to and through parking areas.
2. Prohibit parking on or adjacent to access roads, or in non-designated areas.
3. Parking will not be allowed in areas which limit sight distance of passing motorists.
4. CONTRACTOR is responsible for his vehicles while on-site.

3.03 HAUL ROUTES

A. Consult with governing authorities and establish thoroughfares which will be used as haul routes and site access.

B. Provide traffic control of haul routes to expedite traffic flow and to minimize interference with normal traffic.

3.04 ADDITIONAL REQUIREMENTS

A. The CONTRACTOR shall maintain the traveled way reasonable smooth and hard at all times, and shall be well drained and free of potholes, bumps, irregularities and depressions that hold or retain water. Construction operations shall be conducted to insure a minimum of delay to traffic. Stopping traffic for more than five minutes shall not be permitted unless specifically authorized, in writing, by the ENGINEER. The necessary equipment and personnel to attain and maintain a satisfactory riding surface shall be available and used as needed at all times when work is under way and when work is temporarily suspended for any period of time. Special attention to maintenance of a satisfactory traveled way shall be given during weekends, holidays and the winter season.

B. The CONTRACTOR shall provide a sufficient number of competent flagmen in areas where traffic exists, particularly where construction equipment is operating. Each flagger shall use a safety vest with the appropriate color per OSHA regulations. The vest shall be worn outside all other clothing worn by the flagger.

C. Traffic shall be maintained in accordance with the details shown in conformance with the Manual of Uniform Traffic Control Devices, latest revision with New York State modifications.

D. Fencing
   1. The CONTRACTOR shall completely enclose all open excavations and all other potentially hazardous location, at the end of each working day by temporary fences. Fencing shall be not less than four feet in height, mounted in steel angles or other satisfactory means of support rigidly driven into the ground and spaced at intervals not to exceed eight feet. A minimum of one flasher per fifteen feet of fencing will be required. In areas where an excavation is to remain open in excess of 14 calendar days, rigid fencing will be required having supports at intervals not to exceed four feet. Snow fence, cyclone fence, or wire fabric with rectangular mesh are considered minimally acceptable fencing materials.
   2. The ENGINEER in charge may limit, extend, include or exclude areas to be fenced as conditions warrant.

E. Where sidewalk has been removed by the CONTRACTOR, he will be responsible for establishing a temporary stabilized walk for pedestrian traffic within 24 hours after removal of the sidewalk. This sidewalk may be located in the location of the original sidewalk or adjacent to the original sidewalk, providing there is an adequate right-of-way and the new location is safe for pedestrian traffic. The minimum width of the walkway is 4 feet. No additional Payment will be made for installing and/or maintaining this walkway by the CONTRACTOR.

F. All existing highway signs and supports within the Contract limits are to remain and are to be maintained for the duration of the Contract by the CONTRACTOR.

G. On postal routes, mailboxes serviced from motor vehicles shall be maintained by the CONTRACTOR in a usable location during construction. The CONTRACTOR should not move any mailbox which contains mail. He will advise the property owner to remove such mail before he moves the box. Before acceptance of the work, any mailbox which has been disturbed or removed shall be replaced in size, kind and type by the CONTRACTOR in a location acceptable to the property owner and the ENGINEER.

H. CONTRACTOR must provide access to all school buses and emergency vehicles including ambulances, police cars, fire engines, etc., traveling through or stopping at any part of the construction site. At his expense, CONTRACTOR will yield to these vehicles and cease construction activities, as necessary.

END OF SECTION

SECTION 015701

TEMPORARY CONTROLS

PART1 - GENERAL

1.01 DESCRIPTION

A. Provide and maintain methods, equipment, and temporary construction, as necessary to provide controls over environmental conditions at the construction site and adjacent areas. Remove physical evidence of temporary facilities at completion of Work.

1.02 NOISE CONTROL

A. CONTRACTOR'S vehicles and equipment shall be such as to minimize noise to the greatest degree practicable. Noise levels shall conform to the latest OSHA standards and in no case will noise levels be permitted which interfere with the work of the OWNER or others.

1.03 DUST CONTROL

A. CONTRACTOR shall be responsible for controlling objectionable dust caused by his operation of vehicles and equipment, clearing or for any reason whatever. CONTRACTOR shall apply water or use other methods subject to the ENGINEER'S approval which will keep dust in the air to a minimum.

1.04 PEST AND RODENT CONTROL

A. Provide rodent and pest control as necessary to prevent infestation of construction or storage area.
   1. Employ methods and use materials which will not adversely affect conditions at the site or on adjoining properties.

1.05 WATER CONTROL

A. Provide methods to control surface water and water from excavations and structures to prevent damage to the Work, the site, or adjoining properties
   1. Control fill, grading and ditching to direct water away from excavations, pits, tunnels and other construction areas; and to direct drainage to proper runoff courses so as to prevent any erosion, damage or nuisance.

B. Provide, operate and maintain equipment and facilities of adequate size to control surface water.

C. Dispose of drainage water in a manner to prevent flooding, erosion, or other damage to any portion of the site or to adjoining areas and in conformance with all environmental requirements.

1.06 POLLUTION CONTROL

A. Provide methods, means and facilities required to prevent contamination of soil, water or atmosphere by the discharge of noxious substances from construction operations.

B. Provide equipment and personnel, perform emergency measures required to contain any spillages, and to remove contaminated soils or liquids.
   1. Excavate and dispose of any contaminated earth offsite, and replace with suitable compacted fill and topsoil.

C. Take special measures to prevent harmful substances from entering public waters.
   1. Prevent disposal of wastes, effluents, chemicals, or other such substances adjacent to streams, or in sanitary or storm sewers.

D. Provide systems for control of atmospheric pollutants.
   1. Prevent toxic concentrations of chemicals.
   2. Prevent harmful dispersal of pollutants into the atmosphere.

E. All CONTRACTOR'S equipment used during construction shall conform to all current federal, state and local laws and regulations.

1.07 EROSION CONTROL

A. Plan and execute construction and earthwork by methods to control surface drainage from cuts and fills, and from borrow and waste disposal areas, to prevent erosion and sedimentation.
   1. Hold the areas of bare soil exposed at one time to a minimum.
   2. Provide temporary control measures such as berms, dikes, and drains.

B. Construct fills and waste areas by selective placement to eliminate surface silts or clays, which will erode.

C. Periodically inspect earthwork to detect any evidence of the start of erosion, apply corrective measures as required to control erosion.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 015733

SECURITY

PART 1 - GENERAL

1.01 DESCRIPTION

A. CONTRACTOR shall safely guard all Work, materials, equipment and property from loss, theft, damage and vandalism. CONTRACTOR'S duty to safely guard property shall include the OWNER'S property and other private property from injury or loss in connection with the performance of the Contract.

B. He shall employ watchmen as needed to provide the required security and prevent unauthorized entry.

C. CONTRACTOR may make no claim against the OWNER for damage resulting from trespass.

D. Party responsible for security shall make good all damage to property of OWNER and others arising from failure to provide adequate security.

E. If existing fencing or barriers are breached or removed for purposes of construction, CONTRACTOR shall provide and maintain temporary security fencing equal to the existing in a manner satisfactory to the ENGINEER and OWNER.

F. Security measures taken by the CONTRACTOR shall be at least equal to those usually provided by OWNER to protect his existing facilities during normal operation.

G. Maintain security program throughout construction until OWNER'S acceptance and occupancy precludes need for CONTRACTOR'S security program.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 015735

PROTECTION OF THE WORK AND PROPERTY

PART 1 - GENERAL

1.01 DESCRIPTION

A. CONTRACTOR shall be responsible for taking all precautions, providing all programs, and taking all actions necessary to protect the Work and all public and private property and facilities from damage as specified in the General Conditions and herein.

B. In order to prevent damage, injury or loss, CONTRACTOR'S actions shall include, but not be limited to, the following:
   1. Store apparatus, materials, supplies, and equipment in an orderly, safe manner that will not unduly interfere with the progress of the Work or the Work of any other contractor or utility service company.
   2. Provide suitable storage facilities for all materials which are subject to injury by exposure to weather, theft, breakage, or otherwise.
   3. Place upon the Work or any part thereof only such loads as are consistent with the safety of that portion of the Work.
   4. Clean up frequently all refuse, rubbish, scrap materials, and debris caused by his operations, to the end that at all times the site of the Work shall present a safe, orderly and workmanlike appearance.
   5. Provide barricades and guard rails around openings, for scaffolding, for temporary stairs and ramps, around excavations, elevated walkways and other hazardous areas.

C. CONTRACTOR shall not, except after written consent from proper parties, enter or occupy privately-owned land with men, tools, materials or equipment, except on easements provided herein.

D. CONTRACTOR shall assume full responsibility for the preservation of all public and private property or facility on or adjacent to the site. If any direct or indirect damage is done by or on account of any act, omission, neglect or misconduct in the execution of the Work by the CONTRACTOR, it shall be restored by the CONTRACTOR, at his expense, to a condition equal to that existing before the damage was done

1.02 BARRICADES AND WARNING SIGNALS

A. Where Work is performed on or adjacent to any roadway, right-of- way, or public place, CONTRACTOR shall provide barricades, fences, lights, warning signs, danger signals, watchmen, and shall take other precautionary measures for the

protection of persons or property and of the Work. Barricades shall be painted to be visible at night. From sunset to sunrise, CONTRACTOR shall furnish and maintain at least one light at each barricade. Sufficient barricades shall be erected to keep vehicles from being driven on or into Work under construction. CONTRACTOR shall furnish watchmen in sufficient numbers to protect the Work. CONTRACTOR'S responsibility for the maintenance of barricades, signs, lights, and for providing watchmen shall continue until the Project is accepted by OWNER.

1.03 TREE AND PLANT PROTECTION

A. CONTRACTOR shall protect existing trees, shrubs and plants on or adjacent to the site that are shown or designated to remain in place against unnecessary cutting, breaking or skinning of trunk, branches, bark or roots.

B. Materials or equipment shall not be stored or parked within the drip line.

C. Temporary fences or barricades shall be installed to protect trees and plants in areas subject to traffic.

D. Fires shall not be permitted under or adjacent to trees and plants.

E. Within the limits of the work, water trees and plants that are to remain, in order to maintain their health during construction operations.

F. Cover all exposed roots with burlap that shall be kept continuously wet. Cover all exposed roots with earth as soon as possible. Protect root systems from mechanical damage and damage by erosion, flooding, run-off or noxious materials in solution.

G. If branches or trunks are damaged, prune branches immediately and protect the cut or damaged areas with a nursery product specifically for horticultural use in a manner approved by the ENGINEER.

H. All damaged trees and plants that die or suffer permanent injury shall be removed when ordered by the ENGINEER and replaced by a specimen of equal or better quality.

I. Coordinate work in this section with requirements of Division 2 Technical Specifications.

1.04 PROTECTION OF EXISTING STRUCTURES

A. Underground Structures:

1. Underground structures are defined to include, but not be limited to, all sewer, water, gas, and other piping, and manholes, chambers, electrical

conduits, tunnels and other existing subsurface work located within or adjacent to the limits of the Work.

2. All underground structures and facilities known to ENGINEER are shown. This information is shown for the assistance of CONTRACTOR in accordance with the best information available, but is not guaranteed to be correct or complete.
3. CONTRACTOR shall explore ahead of his trenching and excavation Work and shall uncover all obstructing underground structures sufficiently to determine their location, to prevent damage to them and to prevent interruption to the services which such structures provide. If CONTRACTOR damages an underground structure, he shall restore it to original condition at his expense.
4. Necessary changes in the location of the Work may be made by ENGINEER, to avoid unanticipated underground structures.
5. If permanent relocation of an underground structure or other subsurface facility is required and is not otherwise provided for in the Contract Documents, ENGINEER will direct CONTRACTOR in writing to perform the Work, which shall be paid for under the provisions of Article 11 of the General Conditions.

B. Surface Structures:

1. Surface structures are defined as all existing buildings, structures and other facilities above the ground surface. Included with such structures are their foundations or any extension below the surface. Surface structures include, but are not limited to, buildings, tanks, walls, bridges, roads, dams, channels, open drainage, piping, poles, wires, posts, signs, markers, curbs, walks and all other facilities that are visible above the ground surface.

C. Protection of Underground and Surface Structures:

1. CONTRACTOR shall sustain in their places and protect from direct or indirect injury all underground and surface structures located within or adjacent to the limits of the Work. Such sustaining and supporting shall be done carefully and as required by the party owning or controlling such structure. Before proceeding with the work of sustaining and supporting such structure, CONTRACTOR shall satisfy the ENGINEER that the methods and procedures to be used have been approved by the party owning same.
2. CONTRACTOR shall assume all risks attending the presence or proximity of all underground and surface structures within or adjacent to the limits of the Work. CONTRACTOR shall be responsible for all damage and expense for direct or indirect injury caused by his Work to any structure. CONTRACTOR shall repair immediately all damage caused by his work, to the satisfaction of the owner of the damaged structure.

D. All other existing surface facilities, including but not limited to, guard rails, posts, guard cables, signs, poles, markers, and curbs which are temporarily removed to facilitate installation of the Work shall be replaced and restored to their original condition at CONTRACTOR'S expense.

1.05 PROTECTION OF FLOORS, ROOFS, AND CEILINGS

A. CONTRACTOR shall protect floors, roofs and ceilings during the entire construction period.

B. Proper protective covering shall be used when moving heavy equipment, handling materials or other loads, when painting, handling mortar and grout and when cleaning walls and ceilings.

C. Use metal pans to collect all oil and cuttings from pipe, conduit, or rod threading machines and under all metal cutting machines.

D. Roofs and ceilings shall not be loaded without written permission of the ENGINEER.

1.05 PROTECTION OF INSTALLED PRODUCTS AND LANDSCAPING

A. Provide protection of installed products to prevent damage from subsequent operations. Remove protection facilities when no longer needed, prior to completion of Work.

B. Control traffic to prevent damage to equipment, materials and surfaces.

C. Provide coverings to protect equipment and materials from damage.
   1. Cover projections, wall corners, and jambs, sills and soffits of openings, in areas used for traffic and for passage of products in subsequent work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 015750

RESPIRABLE CRYSTALLINE SILICA

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified.
The work specified shall include all labor, materials, tools, equipment, services, and incidentals necessary to work around respirable crystalline silica (RCS).

B. Related Work Specified Elsewhere.
1. Section 033000 – Cast-in-Place Concrete
2. Section 330519 – Ductile Iron Pipe, Fittings and Accessories
3. Section 330110.58 – Testing and Disinfection

1.02 QUALITY ASSURANCE

A. Reference Standards.
1. Code of Federal Regulations U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), 29 CFR 1926.1153, Respirable Crystalline Silica.
2. New York State Department of Labor, Public Employee Safety and Health Bureau, PESH Act.
3. AWWA Manual M28, Rehabilitation of Water Mains.
4. AWWA Manual M9, Concrete Pressure Pipe.
5. NSF/ANSI Standard 61.
6. Underwriter's Laboratories (UL).
7. International Organization for Standardization (ISO).
8. Factory Mutual Research Corporation.
9. Clean Air Act (CAA).
10. Safe Drinking Water Act (SDWA).
11. ANSI Z88.2-80, Practices for Respiratory Protection.
12. 29 CFR 1910.1200, "Hazard Communication" (OSHA).
13. 29 CFR 1910.134, "Respiratory Protection" (OSHA).
14. 29 CFR 1926, "Construction Industry" (OSHA).
15. Occupational Safety and Health Administration.
16. United States Department of Transportation (USDOT).
17. New York State Department of Environmental Conservation (NYSDEC).
18. New York State Department of Health (NYSDOH).
19. New York State Department of Labor (NYSDOL).
20. New York State Department of Transportation (NYSDOT).

1.03 SUBMITTALS

A. CONTRACTOR shall submit the following prior to the start of work:
   1. A letter from the CONTRACTOR, on company letterhead, stating that they are knowledgeable of all current local, state, and federal requirements regarding respirable crystalline silica, that all work will meet those requirements, and that all workers shall be protected against exposure as defined by OSHA. Letter shall have an original signature, signed by an officer of the company.
   2. Written exposure control plan, as defined in 29 CFR 1926.1153(g) which includes at minimum the following items:
      a. A description of the tasks in the workplace that involve exposure to respirable crystalline silica.
      b. A description of the engineering controls, work practices, and respiratory protection used to limit employee exposure to respirable crystalline silica for each task.
      c. A description of the housekeeping measures used to limit employee exposure to respirable crystalline silica.
      d. A description of the procedures used to restrict access to work areas, when necessary, to minimize the number of employees exposed to respirable crystalline silica and their level of exposure, including exposures generated by other employees or sole proprietors.

1.04 COMPETENT PERSON

A. Prior to the start of work on any given day, CONTRACTOR shall designate one individual on site as the Competent Person.

B. *Competent Person* means, in addition to the definition in 29 CFR 1926.1153(b), one who is capable of identifying existing and foreseeable respirable crystalline silica hazards in the workplace who has the authorization to take prompt corrective measures to eliminate or minimize them.

C. The Competent Person shall have the knowledge and ability necessary to fulfill the responsibilities set forth under 29 CFR 1926.1153(g).

D. The Competent Person shall be responsible for worker and job site safety as required by all relevant respirable crystalline silica regulations and OSHA requirements.

E. The name(s) and contact phone number of the competent person shall be given to the ENGINEER and OWNER before the work is to begin.

1.05 PERMITS AND COMPLIANCE

A. The CONTRACTOR shall assume full responsibility and liability for compliance with all applicable federal, state, and local laws, rules, and regulations pertaining

to work practices, protection of workers, authorized visitors to the site, and persons and property adjacent to the work areas.

1.06 PERSONAL PROTECTIVE EQUIPMENT

A. All use of Personal Protective Equipment (PPE) shall be in compliance with applicable OSHA regulations and procedures.

1.07 SIGNS AND LABELS

A. Provide warning signs and barrier tapes at all approaches to the Work area. Locate signs at such distance that personnel may read the sign and take the necessary protective steps required before entering the area.

1.08 OTHER PRODUCTS OR MATERIALS

A. Other products or materials that are required for use during work activities shall comply with local, state, and federal codes and regulations, if applicable. The CONTRACTOR is expected to furnish and utilize industry standard equipment and materials. The CONTRACTOR shall not furnish equipment or materials that have been altered in such a manner that violates local, state, and/or federal codes and regulations, or presents unnecessary health and safety risk.

PART 2 – MATERIALS – NOT USED

PART 3 - EXECUTION

3.01 WORK PROCEDURES

A. The Competent Person shall be on site at all times Work is progressing.

B. All Work shall be performed in such a manner as to minimize the risk of exposure to personnel and to minimize the risk of release of respirable crystalline silica or respirable crystalline silica-containing debris to the environment.

C. All Work shall be performed in strict accordance with the Project Documents and all governing codes, rules, and regulations. The information contained within this specification section will be considered part of the Project Documents. Where conflicts occur between the Project Documents and applicable codes, rules, and regulations, the more stringent procedure(s) shall apply.

D. The CONTRACTOR shall take notice, and make employees aware, of occupational safety hazards associated with the work being performed on-site.

3.02 PROHIBITED WORK PRACTICES AND ENGINEERING CONTROLS

A. CONTRACTOR shall not use procedures that subject silica sources to forces that will crumble, pulverize, or reduce to powder the silica sources.

B. The following work practices and engineering controls shall **not** be used on silica sources during construction:

1. High-speed abrasive disc saws and sanders not equipped with point of cut ventilator or enclosures with HEPA filtered exhaust air.
2. Carbide-tipped cutting blades.
3. Electrical drills, chisels, and rasps used to make field connections in concrete pipe.
4. Shell cutters used to cut entry holes in concrete pipe.
5. A hammer and chisel without using wet techniques to remove pipe connections.
6. Compressed air used to remove dust or other debris containing respirable crystalline silica.
7. Dry sweeping, dry shoveling, or other dry clean-up of dust.
8. Employee rotation as a means of reducing employee exposure to respirable crystalline silica.
9. Fans or other air handling techniques used to deliberately move the respirable crystalline silica to other locations or away from the work site.

3.03 PAYMENT

A. All costs for work involving respirable crystalline silica are included in the various bid items of the Contract.

END OF SECTION

SECTION 016500

TRANSPORTATION AND HANDLING OF MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A. CONTRACTOR shall make all arrangements for transportation, delivery and handling of equipment and materials required for prosecution and completion of the Work. Included in CONTRACTOR'S work shall be acceptance of consignment and coordination of equipment deliveries for equipment purchased by OWNER.

B. Shipments of materials to CONTRACTOR or Subcontractors shall be delivered to the site only during regular working hours. Shipments shall be addressed and consigned to the CONTRACTOR giving name of Project, street number and city. Shipments shall not be delivered to OWNER except where otherwise directed.

C. If necessary to move stored materials and equipment during construction, CONTRACTOR shall move or cause to be moved materials and equipment without any additional compensation.

1.02 DELIVERY

A. Arrange deliveries of products in accordance with construction schedules and in ample time to facilitate inspection prior to installation.

B. Coordinate deliveries to avoid conflict with Work and conditions at site and to accommodate the following:
   1. Work of other contractors, or OWNER.
   2. Limitations of storage space.
   3. Availability of equipment and personnel for handling products.
   4. OWNER'S use of premises.
   5. Work under other construction projects on OWNER'S site.

C. Do not have products delivered to project site until related Shop Drawings have been approved by the ENGINEER.

D. Do not have products delivered to site until required storage facilities have been provided.

E. Have products delivered to site in manufacturer's original, unopened, labeled containers. Keep ENGINEER informed of delivery of all equipment to be incorporated in the Work.

F. Partial deliveries of component parts of equipment shall be clearly marked to identify the equipment, to permit easy accumulation of parts and to facilitate assembly.

G. Immediately on delivery, inspect shipment to assure:
   1. Product complies with requirements of Contract Documents and reviewed submittals.
   2. Quantities are correct.
   3. Containers and packages are intact, labels are legible.
   4. Products are properly protected and undamaged.

1.03 PRODUCT HANDLING

A. Provide equipment and personnel necessary to handle products by methods to prevent soiling or damage to products or packaging.

B. Provide additional protection during handling as necessary to prevent scraping, marring or otherwise damaging products or surrounding surfaces.

C. Handle products by methods to prevent bending or overstressing.

D. Lift heavy components only at designated lifting points.

E. Materials and equipment shall at all times be handled in a safe manner and as recommended by manufacturer or supplier so that no damage will occur to them. Do not drop, roll or skid products off delivery vehicles. Hand carry or use suitable materials handling equipment.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 016600

STORAGE OF MATERIAL

PART 1 - GENERAL

1.01 DESCRIPTION

A. Store and protect materials in accordance with manufacturer's recommendations and requirements of Specifications.

B. CONTRACTOR shall make all arrangements and provisions necessary for the storage of materials and equipment. All excavated materials, construction equipment, and materials and equipment to be incorporated into the Work shall be placed so as not to injure any part of the Work or existing facilities and so that free access can be had at all times to all parts of the Work and to all public utility installations in the vicinity of the Work. Materials and equipment shall be kept neatly and compactly stored in locations that will cause a minimum of inconvenience to other contractors, public travel, adjoining owners, tenants and occupants. Arrange storage in a manner to provide easy access for inspection.

C. CONTRACTOR shall be consigned responsibility for scheduling, coordination of delivery and manufacturer's representatives' services, on-site storage, and handling of equipment items purchased directly by OWNER for this project. CONTRACTOR shall make provisions for temporary storage, if required, and all handling of said equipment items.

D. Areas available on the construction site for storage of material and equipment shall be as shown or approved by the ENGINEER.

E. Materials and equipment which are to become the property of the OWNER shall be stored to facilitate their inspection and insure preservation of the quality and fitness of the Work, including proper protection against damage by freezing and moisture. They shall be placed inside storage areas unless otherwise acceptable to OWNER.

F. Lawns, grass plots or other private property shall not be used for storage purposes without written permission of the property owner or other person in possession or control of such remises.

G. CONTRACTOR shall be fully responsible for loss or damage to stored materials and equipment.

H. Do not open manufacturer's containers until time of installation unless recommended by the manufacturer or otherwise specified.

I. Do not store products in the structures being constructed unless approved in writing by the ENGINEER.

1.02 UNCOVERED STORAGE

A. The following types of materials may be stored out-of-doors without cover:
   1. Reinforcing steel.
   2. Precast concrete items.
   3. Masonry block and brick.
   4. Castings.
   5. Manholes and exterior buried pipe.

B. Store the above materials on wood blocking so there is no contact with the ground.

1.03 COVERED STORAGE

A. The following types of materials may be stored out-of-doors if covered with material impervious to water:
   1. Rough lumber.
   2. Piping.

B. Tie down covers with rope and slope to prevent accumulation of water on covers.

C. Store materials on wood blocking.

1.04 FULLY PROTECTED STORAGE

A. Store all products not named above in buildings or trailers which have a concrete or wooden floor, a roof, and fully closed walls on all sides.

B. Provide heated storage space for materials which would be damaged by freezing.

C. Protect mechanical and electrical equipment from being contaminated by dust, dirt and moisture.

D. Maintain humidity at levels recommended by manufacturers for electrical and electronic equipment.

1.05 MAINTENANCE OF STORAGE

A. Maintain periodic system of inspection of stored products on scheduled basis to assure that:
   1. State of storage facilities is adequate to provide required conditions.
   2. Required environmental conditions are maintained on continuing basis.
   3. Products exposed to elements are not adversely affected.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 017000

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Closeout procedures.

B. Starting of systems.

C. Demonstration and instructions.

D. Testing, adjusting, and balancing.

E. Project record documents.

F. Operation and maintenance data.

G. Manual for equipment and systems.

H. Spare parts and maintenance products.

I. Product warranties and product bonds.

J. Maintenance service.

K. Examination.

L. Preparation.

M. Execution.

N. Cutting and patching.

O. Protecting installed construction.

P. Final cleaning.

1.02 CLOSEOUT PROCEDURES

A. Prerequisites to Substantial Completion: Complete following items before requesting Certification of Substantial Completion, either for entire Work or for portions of Work:

1. Submit maintenance manuals, Project record documents, digital images of construction photographs, and other similar final record data in compliance with this Section.

2. Complete facility startup, testing, adjusting, balancing of systems and equipment, demonstrations, and instructions to Owner's operating and maintenance personnel as specified in compliance with this Section.
3. Conduct inspection to establish basis for request that Work is substantially complete. Create comprehensive list (initial punch list) indicating items to be completed or corrected, value of incomplete or nonconforming Work, reason for being incomplete, and date of anticipated completion for each item. Include copy of list with request for Certificate of Substantial Completion.
4. Obtain and submit releases enabling Owner's full, unrestricted use of Project and access to services and utilities. Include certificate of occupancy, operating certificates, and similar releases from authorities having jurisdiction and utility companies.
5. Deliver tools, spare parts, extra stocks of material, and similar physical items to Owner.
6. Make final change-over of locks eliminating construction master-key system and transmit keys directly to Owner. Advise Owner's personnel of change-over in security provisions.
7. Discontinue or change over and remove temporary facilities and services from Project Site, along with construction tools, mockups, and similar elements.
8. Perform final cleaning according to this Section.

B. Substantial Completion Inspection:
1. When Contractor considers Work to be substantially complete, submit to Engineer Owner:
   a. Written certificate that Work, or designated portion, is substantially complete.
   b. List of items to be completed or corrected (initial punch list).
2. Within seven days after receipt of request for Substantial Completion, Engineer will make inspection to determine whether Work or designated portion is substantially complete.
3. Should Engineer determine that Work is not substantially complete:
   a. Engineer will promptly notify Contractor in writing, stating reasons for its opinion.
   b. Contractor shall remedy deficiencies in Work and send second written request for Substantial Completion to Engineer.
   c. Engineer will reinspect Work.
   d. Redo and Inspection of Deficient Work: Repeated until Work passes Engineer’s inspection.
4. When Engineer’s finds that Work is substantially complete, Engineer will:
   a. Prepare Certificate of Substantial Completion on EJCDC C-625 - Certificate of Substantial Completion, accompanied by Contractor's list of items to be completed or corrected as verified and amended by Engineer and Owner (final punch list).
   b. Submit Certificate to Owner and Contractor for their written acceptance of responsibilities assigned to them in Certificate.

5. After Work is substantially complete, Contractor shall:
    a. Allow Owner occupancy of Project under provisions stated in Certificate of Substantial Completion.
    b. Complete Work listed for completion or correction within time period stipulated.
6. Owner will occupy all of building as specified in Section 011000 - Summary.

C. Prerequisites for Final Completion: Complete following items before requesting final acceptance and final payment.
1. When Contractor considers Work to be complete, submit written certification that:
    a. Contract Documents have been reviewed.
    b. Work has been examined for compliance with Contract Documents.
    c. Work has been completed according to Contract Documents.
    d. Work is completed and ready for final inspection.
2. Submittals: Submit following:
    a. Final punch list indicating all items have been completed or corrected.
    b. Final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
    c. Specified warranties, workmanship/maintenance bonds, maintenance agreements, and other similar documents.
    d. Accounting statement for final changes to Contract Sum.
    e. Contractor's affidavit of payment of debts and claims on AIA G706 - Contractor's Affidavit of Payment of Debts and Claims.
    f. Contractor affidavit of release of liens on AIA G706A - Contractor's Affidavit of Release of Liens.
    g. Consent of surety to final payment on AIA G707 - Consent of Surety to Final Payment Form.
3. Perform final cleaning for Contractor-soiled areas according to this Section.

D. Final Completion Inspection:
1. Within seven days after receipt of request for final inspection, Engineer will make inspection to determine whether Work or designated portion is complete.
2. Should Engineer consider Work to be incomplete or defective:
    a. Engineer will promptly notify Contractor in writing, listing incomplete or defective Work.
    b. Contractor shall remedy stated deficiencies and send second written request to Engineer that Work is complete.
    c. Engineer will reinspect Work.
    d. Redo and Inspection of Deficient Work: Repeated until Work passes Engineer's inspection.

1.03 STARTING OF SYSTEMS

A. Coordinate schedule for startup of various equipment and systems.

B. Notify Engineer and Owner seven days prior to startup of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

D. Verify that tests, meter readings, and electrical characteristics agree with those required by equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute startup under supervision of manufacturer's representative or Contractors' personnel according to manufacturer's instructions.

G. When specified in individual Specification Sections, require manufacturer to provide authorized representative who will be present at Site to inspect, check, and approve equipment or system installation prior to startup and will supervise placing equipment or system in operation.

H. Submit a written report according to Section 013300 – Shop Drawing Procedures that equipment or system has been properly installed and is functioning correctly.

1.04 DEMONSTRATION AND INSTRUCTIONS

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

B. Demonstrate Project equipment and instruct in classroom environment located at Waste Water Treatment Facility and instructed by manufacturer's representative who is knowledgeable about the Project.

C. Video Recordings: Provide high-quality color video recordings of demonstration and instructional sessions. Engage commercial videographer to record sessions. Include classroom instructions, demonstrations, board diagrams, and other visual aids. Include menu navigation.

D. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

E. Use operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

F. Demonstrate startup, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.

G. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

H. Required instruction time for each item of equipment and system is specified in individual Specification Sections.

1.05 PROJECT RECORD DOCUMENTS

A. Maintain on Site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed Shop Drawings, product data, and Samples.
   6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress, not less than weekly.

E. 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 used.
   3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction as follows:
   1. Include Contract modifications such as Addenda, supplementary instructions, change directives, field orders, minor changes in the Work, and change orders.
   2. Include locations of concealed elements of the Work.
   3. Identify depth of buried utility lines and provide dimensions showing distances from permanent facility components that are parallel to utilities.
   4. Dimension ends, corners, and junctions of buried utilities to permanent facility components using triangulation.
   5. Identify and locate existing buried or concealed items encountered during Project.
   6. Measured depths of foundations in relation to finish main floor datum.
   7. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

8. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
9. Field changes of dimension and detail.
10. Details not on original Drawings.

G. Submit marked-up paper copy documents to Engineer before Substantial Completion.

H. Submit final PDF electronic files of documents to Engineer with claim for final Application for Payment.

1.06 OPERATION AND MAINTENANCE DATA

A. Submit in PDF composite electronic indexed file.

B. Submit data bound in 8-1/2 x 11-inch text pages, three D side ring binders with durable plastic covers.

C. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS," title of Project, and subject matter of binder when multiple binders are required.

D. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

E. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

F. Contents: Prepare table of contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
1. Part 1: Directory, listing names, addresses, and telephone numbers of Engineer, Contractor, Subcontractors, and major equipment suppliers.
2. Part 2: Operation and maintenance instructions, arranged by process flow and subdivided by Specification Section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Include the following:
    a. Significant design criteria.
    b. List of equipment.
    c. Parts list for each component.
    d. Operating instructions.
    e. Maintenance instructions for equipment and systems.
    f. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
    g. Safety precautions to be taken when operating and maintaining or working near equipment.

3. Part 3: Project documents and certificates, including the following:
    a. Shop Drawings and product data.
    b. Air and water balance reports.
    c. Certificates.
    d. Photocopies of warranties.

1.07 MANUAL FOR MATERIALS AND FINISHES

A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.

B. For equipment or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

C. Submit one copy of completed volumes before Substantial Completion. Draft copy be reviewed and returned after Substantial Completion, with Engineer comments. Revise content of document sets as required prior to final submission.

D. Submit three sets of revised final volumes within ten days after final inspection.

E. Submit in PDF composite electronic indexed file of final manual within ten days after final inspection.

F. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Include information for re-ordering custom-manufactured products.

G. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

H. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.

I. Additional Requirements: As specified in individual product Specification Sections.

J. Include listing in table of contents for design data, with tabbed fly sheet and space for insertion of data.

1.08 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Engineer will review draft and return one copy with comments.

B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

C. Submit one copy of completed volumes before Substantial Completion. Draft copy will be reviewed and returned after Substantial Completion, with Engineer comments. Revise content of document sets as required prior to final submission.

D. Submit three sets of revised final volumes within ten days after final inspection.

E. Submit in PDF composite electronic indexed file of final manual within ten days after final inspection.

F. Each Item of Equipment and Each System: Include description of unit or system and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

G. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; by label machine.

H. Include color-coded wiring diagrams as installed.

I. Operating Procedures: Include startup, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and special operating instructions.

J. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

K. Include servicing and lubrication schedule and list of lubricants required.

L. Include manufacturer's printed operation and maintenance instructions.

M. Include sequence of operation by controls manufacturer.

N. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

O. Include control diagrams by controls manufacturer as installed.

P. Include Contractor's coordination drawings with color-coded piping diagrams as installed.

Q. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

R. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

S. Include test and balancing reports as specified in Section 014000 - Quality Requirements.

T. Additional Requirements: As specified in individual product Specification Sections.

U. Include listing in table of contents for design data with tabbed dividers and space for insertion of data.

1.09 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Furnish spare parts, maintenance, and extra products in quantities specified in individual Specification Sections.

B. Deliver to place in location as directed by Owner; obtain receipt prior to final payment.

1.10 PRODUCT WARRANTIES AND PRODUCT BONDS

A. Obtain warranties and bonds executed in duplicate by responsible Subcontractors, suppliers, and manufacturers within ten days after completion of applicable item of Work.

B. Execute and assemble transferable warranty documents and bonds from Subcontractors, suppliers, and manufacturers.

C. Verify documents are in proper form, contain full information, and are notarized.

D. Co-execute submittals when required.

E. Include table of contents and assemble in three D side ring binder with durable plastic cover.

F. Submit prior to final Application for Payment.

G. Time of Submittals:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
   2. Make other submittals within ten days after date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

1.11 MAINTENANCE SERVICE

A. Furnish service and maintenance of components indicated in Specification Sections during warranty period.

B. Examine system components at frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by manufacturer of original component.

D. Do not assign or transfer maintenance service to agent or Subcontractor without prior written consent of Owner.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that existing Site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual Specification Sections.

D. Verify that utility services are available with correct characteristics and in correct locations.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance according to manufacturer's instructions.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer-required or -recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

3.03 EXECUTION

A. Comply with manufacturer's installation instructions, performing each step in sequence. Maintain one set of manufacturer's installation instructions at Project Site during installation and until completion of construction.

B. When manufacturer's installation instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Verify that field measurements are as indicated on approved Shop Drawings or as instructed by manufacturer.

D. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.
   1. Secure Work true to line and level and within specified tolerances, or if not specified, industry-recognized tolerances.
   2. Physically separate products in place, provide electrical insulation, or provide protective coatings to prevent galvanic action or corrosion between dissimilar metals.
   3. Exposed Joints: Provide uniform joint width and arrange to obtain best visual effect. Refer questionable visual-effect choices to Architect/Engineer for final decision.

E. Allow for expansion of materials and building movement.

F. Climatic Conditions and Project Status: Install each unit of Work under conditions to ensure best possible results in coordination with entire Project.
   1. Isolate each unit of Work from incompatible Work as necessary to prevent deterioration.
   2. Coordinate enclosure of Work with required inspections and tests to minimize necessity of uncovering Work for those purposes.

G. Mounting Heights: Where not indicated, mount individual units of Work at industry recognized standard mounting heights for particular application indicated.
   1. Refer questionable mounting heights choices to Architect/Engineer for final decision.
   2. Elements Identified as Accessible to Handicapped: Comply with applicable codes and regulations.

H. Adjust operating products and equipment to ensure smooth and unhindered operation.

I. Clean and perform maintenance on installed Work as frequently as necessary through remainder of construction period. Lubricate operable components as recommended by manufacturer.

3.04 CUTTING AND PATCHING

A. Employ skilled and experienced installers to perform cutting and patching.

B. Submit written request in advance of cutting or altering elements affecting:
   1. Structural integrity of element.
   2. Integrity of weather-exposed or moisture-resistant elements.
   3. Efficiency, maintenance, or safety of element.

4. Visual qualities of sight-exposed elements.
5. Work of Owner or separate contractor.

C. Execute cutting, fitting, and patching including excavation and fill to complete Work and to:
1. Fit the several parts together, to integrate with other Work.
2. Uncover Work to install or correct ill-timed Work.
3. Remove and replace defective and nonconforming Work.
4. Remove samples of installed Work for testing.
5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

D. Execute Work by methods to avoid damage to other Work and to provide proper surfaces to receive patching and finishing.

E. Cut masonry and concrete materials using masonry saw or core drill.

F. Restore Work with new products according to requirements of Contract Documents.

G. Fit Work tight to pipes, sleeves, ducts, conduits, and other penetrations through surfaces.

H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

I. At penetrations of fire-rated walls, partitions, ceiling, or floor construction, completely seal voids with fire-rated material according to Section 078400 - Firestopping, to full thickness of penetrated element.

J. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.

K. Identify hazardous substances or conditions exposed during the Work to Architect/Engineer for decision or remedy.

3.05 PROTECTING INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual Specification Sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate Work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Use durable sheet materials to protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas.

3.06 FINAL CLEANING

A. Execute final cleaning prior to final Project assessment.
   1. Employ experienced personnel or professional cleaning firm.

B. Clean interior and exterior glass and surfaces exposed to view; remove temporary labels, stains, and foreign substances; polish transparent and glossy surfaces.

C. Clean equipment and fixtures to sanitary condition with appropriate cleaning materials.

D. Replace filters of operating equipment.

E. Clean debris from roofs, gutters, downspouts, and drainage systems.

F. Clean Site; sweep paved areas, rake clean landscaped surfaces.

G. Remove waste and surplus materials, rubbish, and construction facilities from Site.

END OF SECTION

SECTION 031000

CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Formwork for cast-in-place concrete.
   2. Shoring, bracing, and anchorage.
   3. Architectural form liners.
   4. Form accessories.
   5. Form stripping.

B. Related Requirements:
   1. Section 032000 - Concrete Reinforcing: Reinforcing steel and required supports for cast-in-place concrete.
   2. Section 033000 - Cast-in-Place Concrete: Cast-in-place or in-situ concrete for structural building frame, slabs-on-grade, and other concrete components associated with building.

1.02 REFERENCE STANDARDS

A. American Concrete Institute:
   1. ACI 117 - Specification for Tolerances for Concrete Construction and Materials.
   2. ACI 301 - Specifications for Structural Concrete.
   3. ACI 318 - Building Code Requirements for Structural Concrete.
   4. ACI 347 - Guide to Formwork for Concrete.

B. American Forest & Paper Association:
   1. AF&PA - National Design Specification (NDS) for Wood Construction.

C. APA - The Engineered Wood Association:
   1. APA/EWA PS 1 - Voluntary Product Standard - Structural Plywood.

D. West Coast Lumber Inspection Bureau:
   1. WCLIB - Standard No. 17 Grading Rules for West Coast Lumber.

1.03 COORDINATION

A. Section 013113 – Project Coordination: Requirements for coordination.

B. Coordinate Work of this Section with other Sections of Work in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.

1.04 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Requirements for submittals.

B. Shop Drawings:
   1. Indicate:
      a. Formwork, shoring, and reshoring.
      b. Pertinent dimensions, openings, methods of construction, types of connections, materials, joint arrangement and details, ties and shores, location of framing, studding and bracing, and temporary supports.
      c. Means of leakage prevention for concrete exposed to view in finished construction.
      d. Sequence and timing of erection and stripping, assumed compressive strength at time of stripping, height of lift, and height of drop during placement.
      e. Vertical, horizontal, and special loads according to ACI 347, and camber diagrams when applicable.
      f. Notes to formwork erector showing size and location of conduits and piping embedded in concrete according to ACI 318.
      g. Procedure and schedule for removal of shores and installation and removal of reshores.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Delegated Design Submittals:
   1. Submit signed and sealed Shop Drawings with design calculations and assumptions for formwork and shoring.
   2. Indicate loads transferred to structure during process of concreting, shoring, and reshoring.
   3. Include structural calculations to support design.

1.05 QUALITY ASSURANCE

A. Perform Work according to ACI 318.

B. For wood products furnished for Work of this Section, comply with AF&PA.

C. Design formwork under direct supervision of Professional Engineer experienced in design of the Work and licensed in the State of New York.

1.06 QUALIFICATIONS

A. Licensed Professional: Professional engineer experienced in design of specified Work and licensed in State of New York.

PART 2 - PRODUCTS

2.01 WOOD FORM MATERIALS

A. Form Materials: At discretion of Contractor and approved by Engineer.

2.02 PREFABRICATED FORMS

A. Manufacturers:
   1. EFCO.
   2. Molded Fiber Glass Construction.
   3. Sonoco Products Co.
   4. Symons by Dayton Superior.
   5. Wall-Ties & Forms, Inc.
   6. Western Forms.
   7. Substitutions: Permitted.

B. Preformed Steel Forms: Minimum 16 gage matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

C. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.

D. Pan Type: Steel of size and profile required.

E. Steel Forms: Sheet steel, suitably reinforced, and designed for particular use indicated on Drawings.

F. Form Liners: Smooth, durable, grainless and non-staining hardboard, unless otherwise indicated on Drawings.

G. Framing, Studding and Bracing: Stud or No. 3 structural light framing grade.

2.03 FORMWORK ACCESSORIES

A. Form Ties: Suitable for concrete wall construction, with waterproofing washer.
   1. Manufacturers:
      a. Heckmann Building Products.
      b. Symons by Dayton Superior.
      c. Wall-Ties & Forms, Inc.
      d. Substitutions: Permitted.

B. Spreaders: Standard, non-corrosive metal form clamp assembly, of type acting as spreaders and leaving no metal within 1 inch of concrete face. Wire ties, wood spreaders or through-bolts not permitted.

C. Form Anchors and Hangers:
   1. Do not use anchors and hangers leaving exposed metal at concrete surface.
   2. Symmetrically arrange hangers supporting forms from structural steel members.
   3. Penetration of structural steel members is not permitted.

D. Form Release Agent: Colorless mineral oil that will not stain concrete, or absorb moisture.
   1. Manufacturers:
      a. Architectural Concrete Chemicals, LLC.
      b. Nox-Crete Products Group.
      c. Substitutions: Per Section 012513 – Substitution Procedures.

E. Corners: Chamfer, wood strip type; 1 x 1 inch size; maximum possible lengths.
   1. Manufacturers:
      a. BoMetals, Inc.
      b. Wall-Ties & Forms, Inc.
      c. Substitutions: Per Section 012513 – Substitution Procedures.

F. Dovetail Anchor Slot: Galvanized steel, 22 gage thick, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
   1. Manufacturers:
      a. BoMetals, Inc.
      b. Dur-O-Wal.
      c. Heckmann Building Products.
      d. Substitutions: Per Section 012513 – Substitution Procedures.

G. Flashing Reglets: Rigid PVC, 22 gage thick, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
   1. Manufacturers:
      a. Cheney Flashing Company.
      b. Fry Reglet Corporation.
      c. Heckmann Building Products.
      d. Hohmann & Barnard, Inc.
      e. O'Keeffe's Inc.
      f. W.P. Hickman Systems, Inc.
      g. Substitutions: Per Section 012513 – Substitution Procedures.

H. Vapor Retarder: Where indicated on Drawings, 8 mil thick polyethylene sheet.

I. Bituminous Joint Filler: ASTM D1751.

J. Nails, Spikes, Lag Bolts, Through-bolts, Anchorages: Size, strength and character to maintain formwork in place while placing concrete.

K. Water Stops: PVC, minimum 1,750 psi tensile strength, maximum minus 35 degrees Flow temperature brittleness according to ASTM D-746, 9 inch wide,

maximum possible lengths, ribbed profile, preformed corner sections, heat welded jointing.

1. Manufacturers:
    a. Adeka Ultra Seal/OCM, Inc.
    b. BoMetals, Inc.
    c. JP Specialties, Inc.
    d. Paul Murphy Plastics Co.
    e. Sika Greenstreak.
    f. Vinylex Waterstop & Accessories.
    g. WESTEC Barrier Technologies.
    h. Williams Products, Inc.
    i. Substitutions: Per Section 012513 – Substitution Procedures.

2.04 COATINGS

A. Coatings for Aluminum: Polyamide epoxy finish coat with paint manufacturer's recommended primer for aluminum substrate. Apply one coat primer and one coat finish.

1. Manufacturers:
    a. H&C Concrete Care Products.
    b. Increte Systems, Inc.
    c. Sauereisen.
    d. Substitutions: Per Section 012513 – Substitution Procedures.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and centers before proceeding with formwork.

B. Verify that dimensions agree with Drawings.

C. If formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement, request instructions from Engineer before proceeding.

3.02 INSTALLATION

A. Earth Forms: Not permitted.

B. Formwork:

1. Provide top form for sloped surfaces steeper than 1.5 horizontal to 1 vertical to hold shape of concrete during placement, unless it can be demonstrated that top forms can be omitted.
2. Construct forms to correct shape and dimensions, mortar-tight, braced, and of sufficient strength to maintain shape and position under imposed loads from construction operations.
3. Camber forms where necessary to produce level finished soffits unless indicated otherwise on Drawings.

4. Positioning:
    a. Carefully verify horizontal and vertical positions of forms.
    b. Correct misaligned or misplaced forms before placing concrete.
5. Complete wedging and bracing before placing concrete.
6. Erect formwork, shoring, and bracing to achieve design requirements according to ACI 318.
7. Stripping:
    a. Arrange and assemble formwork to permit dismantling and stripping.
    b. Do not damage concrete during stripping.
    c. Permit removal of remaining principal shores.
8. Obtain approval of Engineer before framing openings in structural members not indicated on Drawings.
9. Do not reuse wood formwork more than two times for concrete surfaces to be exposed to view.
10. Do not patch formwork.
11. Leave forms in place for minimum number of days according to ACI 347.

C. Form Removal:
1. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads, and removal has been approved by Architect/Engineer.
2. Loosen forms carefully; do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
3. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged.
4. Discard damaged forms.
5. Form Release Agent:
    a. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
    b. Do not apply form release agent where concrete surfaces are indicated to receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.
    c. Reuse and Coating of Forms: Thoroughly clean forms and reapply form coating before each reuse. For exposed work, do not reuse forms with damaged faces or edges. Apply form coating to forms in accordance with manufacturer’s specifications. Do not coat forms for concrete indicated to receive "scored finish." Apply form coatings before placing reinforcing steel.
6. Form Cleaning:
    a. Clean forms as erection proceeds to remove foreign matter within forms.
    b. Clean formed cavities of debris prior to placing concrete.
    c. Flush with water or use compressed air to remove remaining foreign matter.

d. Ensure that water and debris drain to exterior through cleanout ports.
e. Cold Weather:
1) During cold weather, remove ice and snow from within forms.
2) Do not use de-icing salts.
3) Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure; use compressed air or other dry method to remove foreign matter.

7. Reuse and Coating of Forms:
a. Thoroughly clean forms and reapply form coating before each reuse.
b. For exposed Work, do not reuse forms with damaged faces or edges.
c. Apply form coating to forms according to manufacturer instructions.
d. Do not coat forms for concrete indicated to receive "scored finish."
e. Apply form coatings before placing reinforcing steel.

D. Framing, Studding, and Bracing:
1. Maximum Spacing of Studs:
a. Boards: Maximum 16 inches o.c.
b. Plywood: 12 inches o.c.
2. Size framing, bracing, centering, and supporting members for sufficient strength to maintain shape and position under imposed loads from construction operations.
3. Distribute bracing loads over base area on which bracing is erected.
a. When placed on ground, protect against undermining, settlement, and accidental impact.

E. Form Anchors and Hangers:
1. Do not use anchors and hangers leaving exposed metal at concrete surface.
2. Symmetrically arrange hangers supporting forms from structural-steel members to minimize twisting or rotation of member.
3. Penetration of structural-steel members is not permitted.

F. Inserts, Embedded Parts, and Openings:
1. Install formed openings for items to be embedded in or passing through concrete Work.
2. Locate and set in place items required to be cast directly into concrete.
3. Install accessories straight, level, and plumb, and ensure that items are not disturbed during concrete placement.
4. Joints:
a. Install waterstops continuous without displacing reinforcement.

5. Openings:
    a. Provide temporary ports or openings in formwork as required to facilitate cleaning and inspection.
    b. Locate openings at bottom of forms to allow flushing water to drain.
6. Close temporary openings with tight-fitting panels, flush with inside face of forms, and neatly fitted such that joints will not be apparent in exposed concrete surfaces.

G. Form Ties:
1. Provide sufficient strength and quantity to prevent spreading of forms.
2. Place ties at least 1 inch away from finished surface of concrete.
3. Leave inner rods in concrete when forms are stripped.
4. Space form ties equidistant, symmetrical, and aligned vertically and horizontally unless indicated otherwise on Drawings.

H. Arrange formwork to allow proper erection sequence and to permit form removal without damage to concrete.

I. Construction Joints:
1. Install surfaced pouring strip where construction joints intersect on exposed surfaces to provide straight line at joints.
2. Just prior to subsequent concrete placement, remove strip and tighten forms to conceal shrinkage.
3. Appearance:
    a. Show no overlapping of construction joints.
    b. Construct joints to present same appearance as butted plywood joints.
4. Arrange joints in continuous line straight, true, and sharp.

J. Embedded Items:
1. Make provisions for pipes, sleeves, anchors, inserts, reglets, anchor slots, nailers, waterstops, and other features.
2. Do not embed wood or uncoated aluminum in concrete.
3. Obtain installation and setting information for embedded items furnished under other Sections.
4. Securely anchor embedded items in correct location and alignment prior to placing concrete.
5. Ensure that conduits and pipes, including those made of coated aluminum, meet requirements of ACI 318 regarding size and location limitations.

K. Openings for Items Passing through Concrete:
1. Frame openings in concrete where indicated on Drawings.
2. Establish exact locations, sizes, and other conditions required for openings and attachment of Work specified under other Sections.
3. Coordinate Work to avoid cutting and patching of concrete after placement.

4. Perform cutting and repairing of concrete required as result of failure to provide required openings.

L. Screeds:
1. Set screeds and establish levels for tops of and finish on concrete slabs.
2. Slope slabs to drain where required or as indicated on Drawings.
3. Before depositing concrete, remove debris from space to be occupied by concrete and thoroughly wet forms; remove freestanding water.

M. Screed Supports:
1. For concrete over waterproof membranes and vapor retarder membranes, use cradle-, pad-, or base-type screed supports that will not puncture membrane.
2. Staking through membrane is not permitted.

N. Cleanouts and Access Panels:
1. Provide removable cleanout sections or access panels at bottoms of forms to permit inspection and effective cleaning of loose dirt, debris, and waste material.
2. Clean forms and surfaces against which concrete is to be placed.
3. Remove chips, sawdust, and other debris.
4. Thoroughly blow out forms with compressed air just before concrete is placed.

3.03 TOLERANCES

A. Construct formwork to maintain tolerances according to ACI 318 and ACI 350.

B. Camber:
1. Slabs and Beams: 1/4 inch per 10 feet.

3.04 FIELD QUALITY CONTROL

A. Inspection:
1. Inspect erected formwork, shoring, and bracing to ensure that Work complies with formwork design and that supports, fastenings, wedges, ties, and items are secure.
2. Notify Architect/Engineer after placement of reinforcing steel in forms but prior to placing concrete.
3. Schedule concrete placement to permit formwork inspection before placing concrete.

END OF SECTION

SECTION 031500

CONCRETE ANCHORING

PART 1 - GENERAL

1.01 SUMMARY

A. SECTION INCLUDES
1. General purpose mechanical anchors for horizontal and vertical applications.
2. Adhesive anchors.
3. Suspended ceiling hanger anchors.
4. Anchors for light duty horizontal applications where holding power is not critical.
5. Deck inserts for threaded rods or bolts.

B. RELATED SECTIONS
1. Section 033000 - Cast-in-Place Concrete: Concrete that anchors are to be installed in, and other types of cast in place inserts.
2. Section 051200 - Structural Steel Framing: Steel members that anchors are to be installed in.
3. Section 053000 - Steel Floor Decking: Deck that deck inserts are to be installed in.
4. Section 055013 – Miscellaneous Metal Fabrications: Miscellaneous steel members that anchors are to be installed in.
5. Section 260529 - Hangers and Supports for Electrical Systems: Electrical hangers and supports to be hung using anchors specified in this section.

1.02 REFERENCES

A. American Society for Testing and Materials:
1. ASTM A 194/A 194M - Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure or High-Temperature Service, or Both; 2001a.
2. ASTM A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength; 2000.
3. ASTM A 563 - Standard Specification for Carbon and Alloy Steel Nuts; 2000.
4. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2001b.
5. ASTM B 633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 1998.
6. ASTM B 695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel; 2000.
7. ASTM C 881 - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 1999.

8. ASTM F 436 - Standard Specification for Hardened Steel Washers; 1993 (Reapproved 2000).
9. ASTM F 593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs; 2002.
10. SAE J429 - Mechanical and Material Requirements for Externally Threaded Fasteners; Society of Automotive Engineers; 1999.

1.03 SUBMITTALS

A. Submit under provisions of Section 013300 – Shop Drawing Procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Sizes, locations, and spacing.
2. Installation methods.

C. Engineering Design Data: For each structural application, provide data substantiating specified design requirements, signed by design engineer.

1.04 PROJECT CONDITIONS

A. A variety of coatings and plantings are offered to resist various extremes of corrosion. The corrosive environment in which the anchor or fastener is installed should be considered for each specific application.

B. For adhesive anchors, maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install under environmental conditions outside manufacturer's absolute limits.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer:
1. Power Fasteners.
2. Hilti.

B. Substitutions: Permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 013300 – Shop Drawing Procedures.

2.02 MATERIALS

A. Concrete Anchors - General: Select type and size to achieve required loading capacity using information provided by manufacturer.
1. If required type is not indicated, select type appropriate to conditions and item being fastened.

2. If required loading capacity is not indicated on the drawings, determine required loading capacity in accordance with accepted engineering principles and as required by applicable code.
3. For structural applications, provide engineering design by professional engineer licensed in the State in which the project is located.
4. Use recommended and appropriate safety factors and load reduction factors.
5. For non-structural applications, space anchors as required to support the material being anchored without sagging or deformation.
6. Confirm application requirements for cracked and uncracked concrete substrates.

B. Anchors for Horizontal Light Duty Applications Where Holding Power is Not Critical: Use one of the following:
1. Acceptable Product: Bantam Plug or Fluted Plastic Anchor; injection molded plastic expansion sleeve for sheet metal and wood screws.
2. Acceptable Product: Scru-Lead; tubular lead alloy with flange, for sheet metal and wood screws.
3. Acceptable Product: Hammer Drive Pins; 1/4 inch (6 mm) diameter knob head pin with 0.14 inch (3.5 mm) shank and 3/8 inch (9.5 mm) diameter washer as tool guide; heat treated carbon steel, plated in accordance with ASTM B 633, SC1, Type III.
4. Acceptable Product: Calk-In; tool-set expansion type, pre-assembled antimonial lead alloy calking sleeve and Zamac alloy internally-threaded expander cone, into which machine bolt or screw is inserted and tightened.
5. Acceptable Product: Lag Shield; Zamac alloy screw style anchor for lag bolts.
6. Acceptable Product: Single; expansion type pre-assembled machine bolt anchor with Zamac alloy expansion shield and internally threaded expander cone.
7. Acceptable Product: Double; dual expansion type pre-assembled machine bolt anchor with twin tubular sleeves bound together with high tension spring steel bands that contain two protruding wedge shaped cones; Zamac alloy.
8. Acceptable Product: Nylon Nailin; driven type, pre-assembled nail drive anchor with nylon body.
    a. Mushroom head carbon steel nail plated in accordance with ASTM B 633, SC1, Type III.
    b. Flat head carbon steel nail plated in accordance with ASTM B 633, SC1, Type III.
    c. Round head carbon steel nail plated in accordance with ASTM B 633, SC1, Type III.
    d. Mushroom head Type 304 stainless steel nail.

9. Acceptable Product: Zamac Nailin; driven type, pre-assembled nail drive anchor with Zamac alloy body.
    a. Mushroom head; carbon steel nail plated in accordance with ASTM B 633, SC1, Type III.
    b. Flat head; carbon steel nail plated in accordance with ASTM B 633, SC1, Type III.
    c. Mushroom head; Type 304 stainless steel nail.

C. Deck Inserts: For installation through deck or forms prior to placement of concrete; different diameters color coded for threaded rods or bolts in sizes from 1/4 inch (6 mm) to 3/4 inch (19 mm) diameter; six-sided impact plate providing resistance to rotation; heat treated carbon steel insert plated in accordance with ASTM B 633.
    1. For Steel Deck: Bang-It; for installation in pre-drilled holes, with protective sleeve protruding below deck to prevent applied materials from clogging threads or hiding location.
    2. For Wood Forms: Wood-Knocker, color coded flange on surface of concrete after stripping. Prior to pouring concrete over the wood form, place the Wood-Knocker Concrete Insert (break-off nails down) on the surface of the wood form at the desired location. Strike the impact plate of the insert with a hand held hammer, until the plastic color-coded flange is flush with the wood surface.

D. Suspended Ceiling Hanger Anchors: Tie-wire head; use one of the following:
    1. Acceptable Product: The Power-Stud, one piece, wedge type expansion anchor.
        a. Zinc plated carbon steel anchor body with stainless steel wedges.
    2. Acceptable Product: Drive; driven type, pre-expanded one-piece unit, heat treated carbon steel, plated in accordance with ASTM B 633, SC1, Type III.
    3. Acceptable Product: SPIKE; driven type, pre-expanded one-piece unit that develops compression forces at three different levels in bottom of anchor hole; carbon steel, Grade 8.2, plated in accordance with ASTM B 633, SC1, Type III.
    4. Acceptable Product: Lok-Bolt; torqued expansion type; pre-assembled sleeve style, with triple tined expansion sleeve; carbon steel plated in accordance with ASTM B 633, SC1, Type III.
    5. Acceptable Product: Power-Stud+ SD2; fully threaded, torque-controlled, wedge expansion anchor. Manufactured with a zinc plated carbon steel body and stainless steel expansion clip for premium performance; head marked with length code; for installation by driving into same diameter hole and expanding by turning nut.
    6. Acceptable Product: Power-Stud+ SD1; fully threaded, torque-controlled, wedge expansion anchor. Manufactured with a zinc plated carbon steel body and carbon steel expansion clip for reliable performance; head marked with length code; for installation by driving into same diameter hole and expanding by turning nut.

E. Vertical Rod Anchors: Rod hanger head internally threaded to accept steel threaded rod or threaded bolt; use one of the following:
   1. Acceptable Product: The Power-Stud, one piece, wedge type expansion anchor.
      a. Mechanically galvanized carbon steel anchor body with stainless steel wedges.
      b. Stainless steel Type 304.
      c. Stainless steel Type 316.
   2. Acceptable Product: Rod Hanger Lok-Bolt; torqued expansion type; pre-assembled sleeve style, with triple tined expansion sleeve; carbon steel plated in accordance with ASTM B 633, SC1, Type III.
   3. Acceptable Product: Snake+ anchor, internally threaded, self-tapping screw anchor. The screw anchor is installed into a drilled hole with a power tool and a setting tool. Zinc plated carbon steel with unified course internal threads. Zinc plating according to ASTM B633, SC1, Type III (Fe/Zn 5) – interior low level corrosion environment. Anchor Size: 3/8 inch (9.5 mm) diameter with shallow embedment.
   4. Acceptable Product: Vertigo; hardened carbon steel plated in accordance with ASTM B 633, SC1, Type III.
      a. For Wood: Thread forming wood screw; either vertical or side mounting of rod/bolt.
      b. For Steel: Self-drilling, self-tapping screw; either vertical or side mounting of rod/bolt.
      c. For Concrete: Double lead threaded bolt with integral washer, to be installed in hole pre-drilled using matched tolerance bit; vertical mounting of rod/bolt.

F. Epoxy Injection Adhesive Anchoring System: Type recommended by manufacturer for application and use, rated for loadings and anchored items required.
   1. Acceptable Product: AC100+ Gold; two component, all weather, high performance, epoxy acrylate. Anchor Size Range: 3/8 inch to 1-1/4 inches (9.5mm to 32 mm) and 1/2 inch to 3/4 inch (13 mm to 19 mm) internally threaded inserts. Complies with descriptive requirements of ASTM C 881, Type IV, Grade 3, Classes A, B, and C, except for gel time; mixed and dispensed through motionless, static mixing nozzle and dispensing tool; shelf life of 15 months. NSF 61 approved.
   2. Acceptable Product: PE1000+; two-component, high strength adhesive anchoring system. Anchor Size range: 3/8 inch to 1-1/4 inches (9.5 mm to 32 mm). Conforms to requirements of ASTM C881, Types I, II, III, IV and V, Grade 3, Classes B & C.

G. Anchors and Inserts for Drilled Anchor Holes with Injection Adhesive:
   1. Threaded Rod: ASTM A 307, carbon steel plated in accordance with ASTM B 633, SC1, with Type III clear chromate treated.
   2. Threaded Rod: ASTM A 193 Grade B7, ASTM A 194 Grade 2H or ASTM A 563 Grade DH nuts, and ASTM F 436 washers; plated in

accordance with ASTM B 633, SC1, with Type II yellow chromate treatment.

3. Threaded Rod: Type 304 stainless steel, passivated.
4. Threaded Rod: Type 316 stainless steel, passivated.
5. Reinforcing Bars: ASTM A 615/A 615M, Grade 60.

H. General Purpose Anchors: Use one of the following:

1. Acceptable Product: Wedge-Bolt+; one piece carbon steel screw anchor with finished hex head with integral washer, double lead thread, chamfered tip, ratchet teeth on underside of head to be installed in hole pre-drilled using Wedge bit; head stamped with diameter and length. Approved for cracked and uncracked concrete. Plated in accordance with ASTM B 633, SC1, Type III.
2. Acceptable Product: Wedge-Bolt; one piece screw anchor with finished hex head with integral washer, double lead thread, chamfered tip, ratchet teeth on underside of head to be installed in hole pre-drilled using matched tolerance bit; head stamped with diameter and length.
   a. Carbon Steel Wedge-Bolt+ installed with Wedge-Bit. Plated in accordance with ASTM B 633, SC1, Type III.
   b. Carbon Steel Wedge-Bolt OT installed with ANSI Drill Bit. Plated in accordance with ASTM B 633, SC1, Type III.
   c. Type 410 Stainless Steel Wedge-Bolt installed with Wedge-Bit.
3. Acceptable Product: Power-Bolt; torque-controlled, self-undercutting type; pre-assembled heavy duty sleeve style, with internal bolt, nylon compression ring, expansion cone with oversized annular ring that expands to undercut the base material.
   a. Hex head, Grade 5 carbon steel, plated in accordance with ASTM B 633, SC1, Type III.
   b. Flat head, Grade 5 carbon steel, plated in accordance with ASTM B 633, SC1, Type III.
   c. Type 303 or 304 stainless steel, ASTM F 593 hex head.
4. Acceptable Product: Power-Stud; torque-controlled, wedge type; one piece body with expansion mechanism consisting of two interlocking independent wedges; head marked with length code; for installation by driving into same diameter hole and expanding by turning nut.
   a. Carbon steel anchor body and wedges, plated in accordance with ASTM B 633, SC1, Type III.
   b. Mechanically galvanized carbon steel anchor body with stainless steel wedges.
   c. Type 304 stainless steel anchor body and wedges.
   d. Type 316 stainless steel anchor body and wedges.
5. Acceptable Product: Power-Stud+ SD2; fully threaded, torque-controlled, wedge expansion anchor. Manufactured with a zinc plated carbon steel body and stainless steel expansion clip for premium performance; head marked with length code; for installation by driving into same diameter hole and expanding by turning nut.

6. Acceptable Product: Power-Stud+ SD1; fully threaded, torque-controlled, wedge expansion anchor. Manufactured with a zinc plated carbon steel body and carbon steel expansion clip for reliable performance; head marked with length code; for installation by driving into same diameter hole and expanding by turning nut.
7. Acceptable Product: Lok-Bolt; torque-controlled; expansion type; preassembled sleeve style, with nylon compression ring and triple tined expansion sleeve.
    a. Carbon steel plated in accordance with ASTM B 633, SC1, Type III.
    b. Stainless steel.
    c. Head: Hex nut.
    d. Head: Acorn nut.
    e. Head: Round head.
    f. Head: Flat head.
8. Acceptable Product: Set-Bolt; driven deformation type, one piece stud style anchor with bottom-bearing external expansion plug; carbon steel plated in accordance with ASTM B 633, SC1, Type III; attached fixture secured with nut and washer on exposed screw threads.
9. Acceptable Product: SPIKE; driven deformation type, pre-expanded one-piece unit that develops compression forces at three different levels in bottom of anchor hole.
    a. Carbon Steel, Mushroom Head.
    b. Carbon Steel, Flat Head.
    c. Type 316 Stainless Steel, Mushroom Head.
    d. Carbon Steel Pipe Spike.
    e. Carbon Steel Tie Wire.
10. Acceptable Product: Drive; driven deformation type, pre-expanded one-piece unit, heat treated carbon steel, plated in accordance with ASTM B 633, SC1, Type III.
    a. Head: Round (tamperproof).
    b. Head: Flat (tamperproof).
11. Acceptable Product: Zamac HAMMER-SCREW; driven deformation type, pre-assembled nail drive anchor with mushroom style head and Zamac alloy body; Phillips screw head for removal.
    a. Carbon steel screw plated in accordance with ASTM B 633, SC1, Type III.
    b. Type 304 stainless steel screw.
12. Acceptable Product: Zamac NAILIN; driven deformation type, pre-assembled nail drive anchor with Zamac alloy body.
    a. Zinc alloy, mushroom head, carbon steel drive pin.
    b. Zinc alloy, flat head, carbon steel drive pin.
    c. Zinc alloy, mushroom head, stainless steel drive pin.
13. Acceptable Product: TAPPER; one-piece screw anchor.
    a. Carbon steel with white Perma-Seal fluoropolymer coating.
    b. Carbon steel with blue Perma-Seal fluoropolymer coating.
    c. Carbon steel with silver Perma-Seal fluoropolymer coating.

d. Carbon steel with bronze Perma-Seal fluoropolymer coating.
e. Type 304 stainless steel.
f. Type 410 stainless steel.
g. Carbon steel. Zinc plated
h. Head: Hex washer.
i. Head: Flat Phillips.

14. Acceptable Product: Hollow-Set Dropin; tool-set expansion type, pre-assembled tapered slotted expansion sleeve of Zamac alloy with threaded steel expansion cone, into which machine bolt is inserted and tightened.
    a. Expansion Cone: Plated in accordance with ASTM B 633, SC1, Type III.
    b. Expansion Cone: Type 304 stainless steel.
15. Acceptable Product: Steel Dropin; tool-set expansion type, pre-assembled shell style with internal expansion plug, into which machine bolt is inserted and tightened.
    a. Carbon steel, smooth wall
    b. Carbon steel, flange (lipped).
    c. Carbon steel, coil thread.
    d. Type 303 stainless steel, smooth wall.
    e. Type 316 stainless steel, smooth wall.
16. Acceptable Product: Mini Dropin; tool-set expansion type, pre-assembled shell style with internal expansion plug, into which machine bolt is inserted and tightened; embedment of 3/4 inch (19 mm) maximum; carbon steel plated in accordance with ASTM B 633, SC1, Type III. Sizes as required for application.
    a. Size: 1/4 inch (6 mm).
    b. Size: 3/8 inch (9.5 mm).
    c. Size: 1/2 inch (12 mm).
    d. As required.
17. Acceptable Product: Snake+; internally threaded self tapping screw anchor. Application in normal weight concrete, structural sand lightweight concrete and concrete over metal deck. Suitable for cracked and uncracked concrete. Case hardened zinc plated carbon steel body. Predrilled hole and setting tool required.
    a. 3/8 inch (9.5 mm) diameter and length as required for application and strength required.

I. Cracked Concrete Anchors: Use one of the following:
1. Acceptable Product: Power-Stud+ SD2; fully threaded, torque-controlled, wedge expansion anchor. Manufactured with a zinc plated carbon steel body and stainless steel expansion clip for premium performance; head marked with length code; for installation by driving into same diameter hole and expanding by turning nut.
2. Acceptable Product: Power-Stud+ SD1; fully threaded, torque-controlled, wedge expansion anchor. Manufactured with a zinc plated carbon steel body and carbon steel expansion clip for reliable performance; head marked with length code; for installation by driving into same diameter hole and expanding by turning nut.

3. Acceptable Product: Wedge-Bolt+; one piece carbon steel screw anchor with finished hex head with integral washer, double lead thread, chamfered tip, ratchet teeth on underside of head to be installed in hole pre-drilled using Wedge bit; head stamped with diameter and length. Approved for cracked and uncracked concrete. Plated in accordance with ASTM B 633, SC1, Type III.
4. Acceptable Product: Snake+; internally threaded self tapping screw anchor. Application in normal weight concrete, structural sand lightweight concrete and concrete over metal deck. Suitable for cracked and uncracked concrete. Case hardened zinc plated carbon steel body. Predrilled hole and setting tool required.
    a. 3/8 inch (9.5 mm) diameter and length as required for application and strength required.
5. Acceptable Product: PE1000+; two-component, high strength adhesive anchoring system. Anchor Size range: 3/8 inch to 1-1/4 inches (9.5 mm to 32 mm). Conforms to requirements of ASTM C881, Types I, II, III, IV and V, Grade 3, Classes B & C.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Engineer of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions and recommendations and as required by applicable code.

B. Apply anchor items neatly, with anchor mounted plumb and level unless otherwise indicated.

3.04 FIELD QUALITY CONTROL

A. The Engineer reserves the right to require the anchor manufacturer's representative to demonstrate proper installation procedures for post-installed anchors and to observe Contractor's installation procedures, at no extra cost to Owner.

B. The Engineer reserves the right to require pullout or shear tests to determine adequacy of anchors, at no extra cost to Owner.

C. Testing: 25% of each type and size of drilled-in anchor shall be proof loaded by the independent testing laboratory. Adhesive anchors and capsule anchors shall not be torque tested unless otherwise directed by the Engineer. If more than 10% of the tested anchors fail to achieve the specified torque of proof load within the limits as defined on the drawings, all anchors of the same diameter and type as the failed anchor shall be tested, unless otherwise instructed by the Engineer.
   1. Tension testing should be performed in accordance with ASTM E488.
   2. Torque shall be applied with a calibrated torque wrench.
   3. Proof loads shall be applied with a calibrated hydraulic ram. Displacement of adhesive and capsule anchors at proof load shall not exceed D/10, where D is the nominal anchor diameter.

END OF SECTION

SECTION 032000

CONCRETE REINFORCING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Reinforcing bars.
   2. Welded wire fabric.
   3. Reinforcement accessories.

B. Related Section:
   1. Section 26026 – Grounding and Bonding for Electrical Systems.

1.02 SUBMITTALS

A. Shop Drawings: Indicate bar sizes, spacings, locations, and quantities of reinforcing steel and welded wire fabric, bending and cutting schedules, and supporting and spacing devices.

B. Certificates: AWS qualification for welders employed on Work.

C. Manufacturer's Certificate: Products meet or exceed specified requirements.

D. Certified copies of mill test report of reinforcement materials analysis.

1.03 QUALITY ASSURANCE

A. Perform Work according to ACI 318.

B. Prepare Shop Drawings according to ACI SP-66.

C. Welders: AWS-qualified within previous 12 months.

PART 2 - PRODUCTS

2.01 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M,60 ksi yield grade, deformed billet bars, uncoated finish.

B. Welded Deformed Wire Fabric: ASTM A497/A497M; in flat sheets; unfinished.

2.02 ACCESSORY MATERIALS

A. Tie Wire: Minimum 16 gage annealed type.

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions.

C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather-exposed Concrete Surfaces: Plastic-coated steel type; size and shape to meet Project conditions.

D. Reinforcing Splicing Devices: Mechanical threaded type; full tension and compression; sized to fit joined reinforcing.
   1. Manufacturers:
      a. Dur-O-Wal.
      b. ERICO International Corp.
      c. Symons by Dayton Superior
      d. Substitutions: Permitted.

2.03 FABRICATION

A. Fabricate concrete reinforcement according to ACI 318 and ACI 350.

B. Form standard hooks for 180 degree bends, 90 degree bend, stirrup and tie hooks, and seismic hooks as indicated on Drawings.

C. Form reinforcement bends with minimum diameters according to ACI 318.

D. Form ties and stirrups from following:
   1. Bars No. 10 and Smaller: No. 3deformed bars and No. 4 deformed bars or as indicated on the Drawings.

E. Locate reinforcement splices at point of minimum stress. Review location of splices with Engineer.

2.04 SOURCE QUALITY CONTROL

A. When fabricator is approved by authority having jurisdiction, submit certificate of compliance indicating Work performed at fabricator's facility conforms to Contract Documents.
   1. Specified shop tests are not required for Work performed by approved fabricator.

PART 3 - EXECUTION

3.01 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position beyond specified tolerance.
   1. Do not weld crossing reinforcement bars for assembly.

B. Space reinforcement bars with minimum clear spacing in accordance with ACI 318.
   1. Where bars are indicated in multiple layers, place upper bars directly above lower bars.

C. Maintain concrete cover around reinforcement in accordance with as follows:

Reinforcement Location		Minimum Concrete Cover
Footings and Concrete Formed Against Earth		3 inches
Concrete exposed to earth or weather	No. 6 bars and larger	2 inches
	No. 5 bars and smaller	2inches
Supported Slabs, Walls, and Joists	No. 14 bars and larger	2 inches
	No. 11 bars and smaller	2 inches
Beams and Columns		2 inches

D. Splice reinforcing where indicated on Drawings according to splicing device manufacturer's instructions.

E. Bond and ground reinforcement in accordance with requirements of Section 260526 – Grounding and Bonding for Electrical Systems.

3.02 ERECTION TOLERANCES

A. Install reinforcement within following tolerances for flexural members, walls, and compression members:

Reinforcement Depth	Depth Tolerance	Concrete Cover Tolerance
Greater than 8 inches	plus or minus 3/8 inch	minus 3/8 inch
Less than 8 inches	plus or minus 1/2 inch	minus 1/2 inch

B. Install reinforcement within tolerances specified in 350 for tank walls.

3.03 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed by Contractor's testing laboratory according to New York State Building Code.

B. Provide free access to Work and cooperate with subcontracted firm.

C. Reinforcement Inspection:
   1. Placement Acceptance: Specified and ACI 318 material requirements and specified placement tolerances.
   2. Welding: Inspect welds in accordance with AWS D1.1.

3. Periodic Placement Inspection: Inspect for correct materials, fabrication, sizes, locations, spacing, concrete cover, and splicing.
4. Weldability Inspection: Inspect for reinforcement weldability when formed from steel other than ASTM A706/A706M.
5. Continuous Weld Inspection: Inspect reinforcement as required by ACI 318.
6. Periodic Weld Inspection: Other welded connections.

D. Place, support and secure reinforcement against displacement.

E. Do not weld crossing reinforcement bars for assembly.

F. Space reinforcement bars with minimum clear spacing according to ACI 318.

G. Maintain concrete cover around reinforcement according to ACI 318 and ACI 350.

H. Bond and ground reinforcement according to requirements of Section 260526 Grounding and Bonding for Electrical Systems.

END OF SECTION

SECTION 033000

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes cast-in-place concrete for the following:
   1. Foundation walls.
   2. Slabs on grade.
   3. Control, expansion and contraction joint devices.
   4. Equipment pads.

B. Related Sections:
   1. Section 031000 - Concrete Forming and Accessories
   2. Section 032000 - Concrete Reinforcing.
   3. Section 033900 - Concrete Curing.
   4. Section 079000 - Joint Protection.

1.02 REFERENCES

A. American Concrete Institute:
   1. ACI 301 - Specifications for Structural Concrete.
   2. ACI 305 - Hot Weather Concreting.
   3. ACI 306.1 - Standard Specification for Cold Weather Concreting.
   4. ACI 308.1 - Standard Specification for Curing Concrete.
   5. ACI 318 - Building Code Requirements for Structural Concrete.
   6. ACI 350 – Code Requirements for Environmental Engineering Concrete Structures.

B. ASTM International:
   1. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
   2. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
   3. ASTM C33 - Standard Specification for Concrete Aggregates.
   4. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
   5. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
   6. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic Cement Concrete.
   7. ASTM C150 - Standard Specification for Portland Cement.
   8. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
   9. ASTM C173/C173M - 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 C330 - Standard Specification for Lightweight Aggregates for Structural Concrete.
13. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
14. ASTM C595 - Standard Specification for Blended Hydraulic Cements.
15. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
16. ASTM C685/C685M - Standard Specification for Concrete Made By Volumetric Batching and Continuous Mixing.
17. ASTM C845 - Standard Specification for Expansive Hydraulic Cement.
18. ASTM C989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
19. ASTM C1017/C1017M - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
20. ASTM C1064/C1064M - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
21. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
22. ASTM C1116 - Standard Specification for Fiber-Reinforced Concrete and Shotcrete.
23. ASTM C1157 - Standard Performance Specification for Hydraulic Cement.
24. ASTM C1218/C1218M - Standard Test Method for Water-Soluble Chloride in Mortar and Concrete.
25. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.
26. ASTM D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
27. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
28. ASTM D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
29. ASTM D6690 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
30. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.
31. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
32. ASTM E1643 - Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs.
33. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

1.03 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Submittal procedures.

B. Product Data: Submit data on joint devices, attachment accessories, admixtures and.

C. Design Data:
   1. Submit concrete mix design for each concrete strength. Submit separate mix designs when admixtures are required for the following:
      a. Hot and cold weather concrete work.
      b. Air entrained concrete work.
   2. Identify mix ingredients and proportions, including admixtures.
   3. Identify chloride content of admixtures and whether or not chloride was added during manufacture.

D. Samples: Submit two 9 x 12 inch long samples of expansion/contraction joint and control joint.

E. Manufacturer's Installation Instructions: Submit installation procedures and interface required with adjacent Work.

1.04 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Accurately record actual locations of embedded utilities and components concealed from view in finished construction.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 318 and ACI 350.

B. Conform to ACI 305 when concreting during hot weather.

C. Conform to ACI 306.1 when concreting during cold weather.

D. Acquire cement and aggregate from one source for Work.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Maintain concrete temperature after installation at minimum 50 degrees F for minimum 7 days.

1.07 COORDINATION

A. Section 013113 – Project Coordination: Coordination and project conditions.

B. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

A. Cement: ASTM C150, Type II – Moderate, or Type IIA - Air Entraining Portland type.

B. Normal Weight Aggregates: ASTM C33.
   1. Coarse Aggregate Maximum Size: In accordance with ACI 318.

C. Water: ACI 318; potable, without deleterious amounts of chloride ions.

2.02 ADMIXTURES

A. Manufacturers:
   1. BASF Construction Chemical.
   2. Euclid Chemical Co.
   3. Grace Construction Products.
   4. Sika Corporation.
   5. Substitutions: Per Section012513 – Substitution Procedures.

B. Air Entrainment: ASTM C260.

C. Chemical: ASTM C494/C494M.

D. Plasticizing: ASTM C1017/C1017M.

2.03 ACCESSORIES

A. Bonding Agent:
   1. Manufacturers:
      a. Euclid Chemical Company.
      b. Sika Corporation.
      c. W.R. Meadows, Inc.
      d. Substitutions: Per Section012513 – Substitution Procedures.

B. Non-Shrink Grout: ASTM C1107/C1107M; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2,400 psi in 48 hours and 7,000 psi in 28 days.
   1. Manufacturers:
      a. Euclid Chemical Co.
      b. L&M Construction Chemical.
      c. QUIKRETE.
      d. Sika Corporation.
      e. Substitutions: Per Section 012513 – Substitution Procedures.

2.04 JOINT DEVICES AND FILLER MATERIALS

A. Joint Filler Type C: ASTM D1752; Premolded sponge rubber.

B. Expansion and Contraction Joint Devices: ASTM B221 alloy, extruded aluminum; resilient elastomeric filler strip with Shore A hardness of 35 to permit plus or minus 25 percent joint movement with full recovery; of longest manufactured length at each location, recessed mounted; color as selected.

C. Sealant and Primer: As specified in Section 079000 – Joint Protection.

2.05 VAPOR BARRIER

A. Vapor barrier shall be six (6) mil polyethylene sheets applied in the widest practicable width with all seams lapped a minimum of six (6) inches, and secured in place.

2.06 CONCRETE MIX

A. Select proportions for concrete in accordance with ACI 318 trial mixtures.

B. Provide concrete to the following criteria:

Material and Property	Measurement
Compressive Strength (28 day)	4,000 psi
Cement Type	ASTM C150
Cement Content (minimum)	606 pounds/cu yd
Aggregate Type	Normal weight
Fine Aggregate	36 percent by volume
Water-Cement Ratio (maximum)	0.46 by weight
Air Content	6.5 percent plus or minus 1.5 percent
Fly Ash Content:	20 percent of cementitious materials by weight, maximum
Silica Fume Content:	0 percent of cementitious materials by weight, maximum
Slag	0 percent of cementitious materials by weight, maximum
Slump	3 inches plus or minus 1 inch

C. Admixtures: Include admixture types and quantities indicated in concrete mix designs only when approved by Engineer.

1. Use accelerating admixtures in cold weather. Use of admixtures will not relax cold weather placement requirements.

2. Do not use calcium chloride nor admixtures containing calcium chloride.
3. Use set retarding admixtures during hot weather.
4. Add air entrainment admixture to concrete mix for work exposed to freezing and thawing or deicing chemicals.
5. For concrete exposed to deicing chemicals, limit fly ash, pozzolans, silica fume, and slag content as required by applicable code.

D. Average Compressive Strength Reduction: Permitted in accordance with ACI 318.

E. Ready Mixed Concrete: Mix and deliver concrete in accordance with ASTM C94/C94M.

F. Site Mixed Concrete: Mix concrete in accordance with ACI 318.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Section 013113 – Project Coordination: Coordination and project conditions.

B. Verify requirements for concrete cover over reinforcement.

C. Verify anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete.

3.02 PREPARATION

A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Remove laitance, coatings, and unsound materials.

B. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

C. Remove debris and ice from formwork, reinforcement, and concrete substrates.

D. Remove water from areas receiving concrete before concrete is placed.

3.03 PLACING CONCRETE

A. Place concrete in accordance with ACI 318 and ACI 350.

B. Notify testing laboratory and Engineer minimum 24 hours prior to commencement of operations.

C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints, are not disturbed during concrete placement.

D. Install vapor retarder under interior slabs on grade in accordance with ASTM E1643. Lap joints minimum 6 inches and seal watertight by taping edges and ends.

E. Repair vapor retarder damaged during placement of concrete reinforcing. Repair with vapor retarder material; lap over damaged areas minimum 6 inches and seal watertight.

F. Separate slabs on grade from vertical surfaces with 1/2 inch thick joint filler.

G. Install construction joint devices in coordination with pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

H. Install joint device anchors. Maintain correct position to allow joint cover to be flush with floor and wall finish.

I. Install joint covers in longest practical length, when adjacent construction activity is complete.

J. Apply sealants in joint devices in accordance with Section 079000 – Joint Protection.

K. Deposit concrete at final position. Prevent segregation of mix.

L. Place concrete in continuous operation for each panel or section determined by predetermined joints.

M. Consolidate concrete.

N. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

O. Place concrete continuously between predetermined expansion, control, and construction joints.

3.04 CONCRETE FINISHING

A. Provide formed concrete surfaces to be left exposed with smooth rubbed finish.

B. Finish concrete floor surfaces in accordance with ACI 318.

C. Steel trowel surfaces which are indicated to be exposed.

D. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at1/4 inch per foot nominal.

3.05 CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
   1. Protect concrete footings from freezing for minimum seven days.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

C. Cure concrete floor surfaces as specified in Section 033900 – Concrete Curing.

3.06 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.

B. Field inspection and testing will be performed by Contractor's testing laboratory in accordance with New York State Building Code.

C. Provide free access to Work and cooperate with subcontracted firm.

D. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of Work.

E. Concrete Inspections:
   1. Continuous Placement Inspection: Inspect for proper installation procedures.
   2. Periodic Curing Inspection: Inspect for specified curing temperature and procedures.

F. Strength Test Samples:
   1. Sampling Procedures: ASTM C172.
   2. Cylinder Molding and Curing Procedures: ASTM C31/C31M, cylinder specimens, field cured.
   3. Sample concrete and make one set of five cylinders for every 75 cu yds or less of each class of concrete placed each day and for every 5,000 sf of surface area for slabs and walls.
   4. When volume of concrete for any class of concrete would provide less than 5 sets of cylinders, take samples from five randomly selected batches, or from every batch when less than 5 batches are used.
   5. Make one additional cylinder during cold weather concreting, and field cure.

G. Field Testing:
   1. Slump Test Method: ASTM C143/C143M.
   2. Air Content Test Method: ASTM C173/C173M.
   3. Temperature Test Method: ASTM C1064/C1064M.
   4. Measure slump and temperature for each compressive strength concrete sample.

5. Measure air content in air entrained concrete for each compressive strength concrete sample.

H. Cylinder Compressive Strength Testing:
1. Test Method: ASTM C39/C39M.
2. Test Acceptance: In accordance with ACI 318.
3. Test one cylinder at 7 days.
4. Test two cylinders at 28 days.
5. Test one cylinder at 14 days.
6. Retain one cylinder for 56 days for testing when requested by Engineer.
7. Dispose remaining cylinders when testing is not required.

I. Core Compressive Strength Testing:
1. Sampling and Testing Procedures: ASTM C42/C42M.
2. Test Acceptance: In accordance with ACI 318.
3. Drill three cores for each failed strength test from concrete represented by failed strength test.

J. Maintain records of concrete placement. Record date, location, quantity, air temperature and test samples taken.

3.07 PATCHING

A. Allow Engineer to inspect concrete surfaces immediately upon removal of forms.

B. Honeycomb or embedded debris in concrete is not acceptable. Notify Engineer upon discovery.

C. Patch imperfections as directed by Engineer.

3.08 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by Engineer.

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Engineer for each individual area.

END OF SECTION

SECTION 033500

CONCRETE FINISHING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Finishing concrete floors.
   2. Floor surface treatment.

B. Related Sections:
   1. Section 033000 - Cast-In-Place Concrete.
   2. Section 033900 - Concrete Curing.
   3. Section 079000 - Joint Protection.

1.02 REFERENCES

A. American Concrete Institute:
   1. ACI 301 - Specifications for Structural Concrete.
   2. ACI 302.1 - Guide for Concrete Floor and Slab Construction.

B. ASTM International:
   1. ASTM E1155 - Standard Test Method for Determining Floor Flatness and of Levelness Using the F-number System.

1.03 SUBMITTALS

A. Product Data: Submit data on sealer, curing compounds and slip resistant treatment, compatibilities, and limitations.

1.04 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Submit data on maintenance renewal of applied coatings.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301 and ACI 302.1.

B. Perform Work in accordance with Building Codes New York State (B.C.N.Y.S.).

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing work of this section with minimum three years documented experience.

1.07 MOCK-UP

A. Construct mock-up area under conditions similar to those which will exist during actual placing, 10 feet long by 10 feet wide, with specified finishes, and coatings applied.

B. Locate where directed by Engineer.

C. Incorporate accepted mockup as part of Work.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's packaging including application instructions.

1.09 ENVIRONMENTAL REQUIREMENTS

A. Temporary Lighting: Minimum 200 W light source, placed 8 feet above floor surface, for each 425 sq ft of floor being finished.

B. Do not finish floors until interior heating system is operational.

C. Temporary Heat: Ambient temperature of 50 degrees F minimum.

D. Ventilation: Sufficient to prevent injurious gases from temporary heat or other sources affecting concrete.

1.10 COORDINATION

A. Coordinate the Work with concrete floor placement and concrete floor curing.

PART 2 - PRODUCTS

2.01 COMPOUNDS - HARDENERS AND SEALERS

A. Sealer:
   1. Manufacturers:
      a. ChemTec Int'l.
      b. Euclid Chemical Company.
      c. Vexcon Chemical Inc.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify floor surfaces are acceptable to receive the Work of this section.

3.02 FLOOR FINISHING

A. Finish concrete floor surfaces in accordance with ACI 301 and ACI 302.1.

B. Steel trowel surfaces which are indicated to be exposed.

C. In areas with floor drains, maintain design floor elevation at walls; slope surfaces uniformly to drains as indicated on Drawings.

3.03 FLOOR SURFACE TREATMENT

A. Apply sealer on floor surfaces.

3.04 TOLERANCES

A. Maximum Variation of Surface Flatness For Exposed Concrete Floors: 1/8 inch in 10 ft.

B. Correct defects in defined traffic floor by grinding or removal and replacement of defective Work. Areas requiring corrective Work will be identified. Re-measure corrected areas by same process.

END OF SECTION

SECTION 033900

CONCRETE CURING

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes initial and final curing of horizontal and vertical concrete surfaces.

1.02 SUBMITTALS

A. Product Data: Curing compounds, Mats, compatibilities, and limitations.

1.03 QUALITY ASSURANCE

A. Perform Work according to ACI 318 and ACI 350.

B. Perform Work according to New York State Department of Transportation Standards.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Membrane Curing Compound: ASTM C309, Type 1D, Class B.
   1. Manufacturers:
      a. Anti-Hydro International.
      b. BASF Corporation-Construction.
      c. ChemMasters, Inc.
      d. Dayton Superior Specialty.
      e. Euclid Chemical Company.
      f. Kaufman Products, Inc.
      g. L&M Construction Chemical.
      h. Lambert Corporation.
      i. Nox-Crete Products Group.
      j. Right Pointe.
      k. SpecChem, LLC.
      l. TK Products.
      m. US Spec.
      n. Vexcon Chemicals Inc.
      o. W.R. Meadows, Inc.
      p. Substitutions: Per Section 012513 – Substitution Procdures.

PART 3 - EXECUTION

3.01 INSTALLATION - HORIZONTAL SURFACES

A. Cure concrete according to ACI 308.1.

B. Spraying: Spray water over floor slab areas and maintain wet for seven days.

C. Membrane Curing Compound: Apply curing compound in one coat.

3.02 INSTALLATION - VERTICAL SURFACES

A. Cure concrete according to ACI 308.1.

B. Membrane Curing Compound: Apply compound in two coats with second coat applied at right angles to first.

END OF SECTION

SECTION 036000

GROUTING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Portland cement grout.
   2. Rapid curing epoxy grout.
   3. Non-shrink cementitious grout.

1.02 SUBMITTALS

A. Product Data: Grout.

B. Manufacturer's Installation Instructions: Mixing, handling, surface preparation and placing epoxy type and non-shrink type grouts.

C. Manufacturer's Certificate: Products meet or exceed specified requirements.

1.03 QUALITY ASSURANCE

A. Perform Work according to New York State Department of Transportation Standards.

1.04 ENVIRONMENTAL REQUIREMENTS

A. Do not perform grouting if temperatures exceed 85 degrees F.

B. Maintain minimum temperature of 50 before, during, and after grouting, until grout has set.

PART 2 - PRODUCTS

2.01 PORTLAND CEMENT GROUT MATERIALS

A. Portland Cement: ASTM C150, Type II.

B. Water:
   1. Potable; containing no impurities, suspended particles, algae or dissolved natural salts in quantities capable of causing:
      a. Corrosion of steel.
      b. Volume change increasing shrinkage cracking.
      c. Efflorescence.
      d. Excess air entraining.

C. Fine Aggregate:
   1. Washed natural sand.
   2. Gradation in accordance with ASTM C33 and represented by smooth granulometric curve within required limits.
   3. Free from injurious amounts of organic impurities as determined by ASTM C40.

D. Mix:
   1. Portland cement, sand and water. Do not use ferrous aggregate or staining ingredients in grout mixes.

2.02 RAPID CURING EPOXY GROUT

A. Manufacturers:
   1. L&M Construction Chemical.
   2. Sika Corporation.
   3. W.R. Meadows, Inc.
   4. Substitutions: Permitted.

B. Rapid-Curing Epoxy Grout: High strength, three-component epoxy grout formulated with thermosetting resins and inert fillers. Rapid-curing, high adhesion, and resistant to ordinary chemicals, acids and alkalis.

Property	Test	Result
Compressive Strength	ASTM C579	12,000 psi at 7 days
Tensile Strength	ASTM C307	2,000 psi minimum
Coefficient of Expansion	ASTM C531	0.000030 in per degree F
Shrinkage	ASTM C827	none

2.03 NON-SHRINK CEMENTITIOUS GROUT

A. Manufacturers:
   1. CGM, Inc.
   2. Euclid Chemical Company.
   3. L&M Construction Chemical.
   4. QUIKRETE.
   5. Sika Corporation
   6. Substitutions: Permitted.

B. Non-shrink Cementitious Grout: Pre-mixed ready for use formulation requiring only addition of water; non-corrosive, non-metallic, non-gas-forming, no chlorides.

C. Properties: Certified to maintain initial placement volume or expand after set and meet following minimum properties when tested according to CRD-C621, for Type D non-shrink grout:

Property	Test	Time	Result
Setting Time	ASTM C191	Initial	2 hours (approx.)
		Final	3 hours (approx.)
Expansion			0.10% - 0.4% Maximum
Compressive Strength	CRD-C621	1 day	4,000 psi
		7 days	7,000 psi
		28 days	10,000 psi to 10,800 psi

2.04 FORMWORK

A. Refer to Section 031000 – Concrete Forming Accessories.

2.05 CURING

A. Prevent rapid loss of water from grout during first 48 hours by using approved membrane curing compound or with by using wet burlap method.

PART 3 - EXECUTION

3.01 PREPARATION

A. Remove defective concrete, laitance, dirt, oil, grease and other foreign material from concrete surfaces until sound, clean concrete surface achieved.

B. Rough concrete lightly, but not enough to interfere with placement of grout.

C. Remove foreign materials from metal surfaces in contact with grout.

D. Align, level, and maintain final positioning of components to be grouted.

E. Saturate concrete surfaces with clean water; remove excess water, leaving none standing.

3.02 INSTALLATION - FORMWORK

A. Construct leakproof forms anchored and shored to withstand grout pressures.

B. Install formwork with clearances to permit proper placement of grout.

3.03 MIXING

A. Portland Cement Grout:
   1. Use proportions of two parts sand to one part cement, measured by volume.
   2. Prepare grout with water to obtain consistency to permit placing and packing.
   3. Mixing Water and Grout: Pre-mix using approximately 2/3 of water; after partial mixing, add remaining water to bring mix to desired placement consistency and continue mixing 2 to 3 minutes.

4. Mix only quantities of grout capable of being placed within 30 minutes after mixing.
5. Do not add additional water after grout has been mixed.

B. Mix and prepare rapid curing epoxy grout according to manufacturer's instructions.

C. Mix and prepare non-shrink cementitious grout according to manufacturer's instructions.

D. Mix grout components in proximity to Work area and transport mixture quickly and in manner not permitting segregation of materials.

3.04 PLACING GROUT

A. Do not use pneumatic-pressure or dry-packing methods; do not vibrate placed grout.

B. Thoroughly compact final installation and eliminate air pockets.

3.05 CURING

A. Immediately after placement, protect grout from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. After grout has attained its initial set, keep damp for minimum of three days.

3.06 FIELD QUALITY CONTROL

A. Perform field inspection and testing according to ACI 318.

B. Submit proposed mix design of each class of grout to inspection and testing firm for review prior to commencement of Work.

C. Tests of grout components may be performed to ensure conformance with specified requirements.

END OF SECTION

SECTION 051200

STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Related Documents
   1. The general provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this Section.
   2. The requirements of this Section also apply to the work specified in the Section 055013 – Miscellaneous Metal Fabrications.

B. Description of Work
   1. The extent of structural steel work is shown on the Drawings, including schedules, notes, and details to show size and location of members, typical connections and type of steel required.

1.02 QUALITY ASSURANCE

A. Codes and Standards

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

1. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)
   a. AISC 201 AISC Certification Program for Structural Steel Fabricators
   b. AISC 303 Code of Standard Practice for Steel Buildings and Bridges
   c. AISC 325 Steel Construction Manual
   d. AISC 326 Detailing for Steel Construction
   e. AISC 810 Design Guide 10: Erection Bracing of Low-Rise Structural Steel Buildings
   f. ANSI/AISC 360 Specification for Structural Steel Buildings
2. AMERICAN WELDING SOCIETY (AWS)
   a. AWS A2.4Standard Symbols for Welding, Brazing and Nondestructive Examination
   b. AWS D1.1/D1.1M Structural Welding Code - Steel
3. ASTM INTERNATIONAL (ASTM)
   a. ASTM A 325 Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
   b. ASTM A 36/A 36M Standard Specification for Carbon Structural Steel
   c. ASTM A 490 Standard Specification for Structural Bolts, alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength

d. ASTM A 500/A 500M Standard Specification for Cold-Formed welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
e. ASTM A 53/A 53M Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
f. ASTM A 572/A 572M Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
g. ASTM A 6/A 6M Standard Specification for General requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling
h. ASTM A 992/A 992M Standard Specification for Structural Steel Shapes
i. ATM C 1107/C 1107M Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
j. ASTM F 1554 Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength
k. ASTM F 436 Hardened Steel Washers
l. ASTM F 844 Washers, Steel, Plain (Flat), Unhardened for General Use

4. CRANE MANUFACTURERS ASSOCIATION OF AMERICA (CMAA)
   a. CMAA 70 EnviroTop Running and Bridge and Gantry Type Multiple Girder Electric Overhead Traveling Cranes, No. 70
5. THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)
   a. SSPC PA 1 Shop, Field, and Maintenance Painting of Steel
   b. SSPC PS 13.01 Epoxy Polyamide Painting System
   c. SSPC Paint 25 Zinc Oxide, Alkyd, Linseed Oil Primer for Use Over Hand Cleaned Steel, Type I and Type II
   d. SSPC SP 3 Power Tool Cleaning
   e. SSPC SP 6/NACE No.3 Commercial Blast Cleaning
6. U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)
   a. 29 CFR 1926.756 Steel Erection; Beams and Columns

B. Qualifications for Welding Work
   1. Qualify welding processes and welding operators in accordance with the AWS "Standard Qualification Procedure".
   2. Prepare test specimens in the presence of a representative from a recognized testing laboratory, and test at the laboratory by standard methods.

1.03 SUBMITTALS

A. Manufacturer's Data, Structural Steel
   1. For information only, submit two (2) copies of producer's or manufacturer's specification and installation instructions for the following products. Include laboratory test reports and other data as required to show compliance with these specifications (including specified standards).

Indicate by transmittal form that copy of each applicable instruction has been distributed to fabricators, installers, and erectors:

a. Structural steel (each type), including certified copies of mill reports covering the chemical and physical properties.
b. High-strength bolts (each type), including nuts and washers.
c. Unfinished bolts and nuts.
d. Electrodes for welding.
e. Structural steel primer paint.
f. Shrinkage-resistant grout.

B. Shop Drawings, Structural Steel

1. Prepare shop drawings indicating complete details and schedules for fabrication for shop assembly of members, and details, schedules, procedures and diagrams showing the sequence of erection.
2. Submit erection and fabrication drawings for approval prior to fabrication. Prepare in accordance with AISC 326 and AISC 325. Fabrication drawings shall not be reproductions of contract drawings. Include complete information for the fabrication and erection of the structure's components, including the location, type, and size of bolts, welds, member sizes and lengths, connection details, blocks, copes, and cuts. Double connections that require an erection seat to comply with OSHA 29 CFR 1926.756(c)(1) shall be shown on the shop drawings, reviewed and approved by the structural engineer of record. Use AWS A2.4 standard welding symbols. Member substitutions of details shown on the contract drawings shall be clearly highlighted on the fabrication drawings. Explain the reasons for any deviations from the contract drawings.

C. Test Laboratory Reports, Structural Steel

1. Submit the following reports in triplicate, directly to the Engineer from the testing laboratory, with copy to the Contractor and other as indicated:
   a. Welder Certification: (for current year)
      1) Shop welders.
      2) Field welders.
   b. Welding Inspection and Test Reports:
      1) Shop Welding:
      2) Magnetic particle.
      3) Radiographic.
      4) Ultrasonic.
      5) Field Welding:
      6) Magnetic particle.
      7) Radiographic.
      8) Ultrasonic.
   c. Bolted Connection Inspection and Test Reports:
      1) High-strength bolting, shop.
      2) High-strength bolting, field.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Material Storage
   1. Protect structural steel members and packaged materials from corrosion and deterioration.
   2. Do not store materials on the structure in a manner that might cause distortion or damage to the supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Wide flange shapes: ASTM A 992/A 992M

B. Rolled Steel Plates and Bars: ASTM A-36 and ASTM A-572, except where other type steel is shown.

C. Structural Steel Tubular Products: Hot-formed structural quality carbon, steel, welded or seamless, as follows:
   1. Square, Rectangular and Special Shapes: ASTM A500, Grade B.
   2. Structural Steel Pipe: ASTM A-53, Type E or S, Grade B.

D. Foundation Anchorage:
   1. 2.2.3.1 Anchor Bolts - ASTM F 1554.
   2. 2.2.3.2 Anchor Nuts - ASTM A 563, Grade A, hex style.
   3. 2.2.3.3 Anchor Washers - ASTM F 844.
   4. 2.2.3.4 Anchor Plate Washers - ASTM A 36/A 36M

E. High-Strength Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers, as follows: for all beam to beam and beam to column connections, as follows:
   1. Quenched and tempered medium-carbon steel bolts, nuts, and washers, complying with ASTM A325.

F. Electrodes for Manual Shielded and Metal-Arc Welding: AWS Code and ASTM A-233, Series E60 or E70 as required.

G. Electrodes and Flux for Submerged Arc Welding: AWS Code and ASTM A-588, Series F70 as required.

H. Structural Steel Primer Paint: Per Part 2.2, Section E of this specification.

I. Overhead, Top Running Crane Rail: AISC 325 30 pound per yard crane rail section and bolted joints. Provide rail fasteners and a minimum rail length of 10 feet.

J. Bedding Mortar:
   1. Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, with no ASTM C 827 shrinkage. Grout shall be nonmetallic.

K. All structural steel incorporated in the work, if in excess of $100,000, be produced or made in whole or substantial part in the United States, its territories or possessions.

2.02 FABRICATION

A. General
   1. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on the final shop drawings. Provide camber in structural members as shown.
   2. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence that will expedite erection and minimize field handling of materials.
   3. Where finishing is required, complete the assembly, including bolting and welding of units, before start of finishing operations.

B. Connections
   1. When reaction values of a beam are not shown on drawing, minimum end connection for beam shall have a strength equal to the reaction produced by the uniform load capacity for the given shape, span and steel specification of the beam in question. Connections shall be H.S. bolted or shop welded, as shown on the contract drawings.
   2. When connection design is shown on the contract drawings, it shall take precedence over the above (B-1).
   3. Bolt field connections, except where welded connections or other connections are shown or specified.
   4. Provide high-strength (Friction Type) threaded fasteners for all principal bolted connections.

C. High-Strength Bolted Construction
   1. Install high-strength threaded fasteners in accordance with AISC "Specifications for Structural Joints".

D. Welded Construction
   1. Comply with AWS code for procedures, appearance and quality of welds, and methods used in correcting welding work.
   2. Assemble and weld built-up sections by methods which will produce true alignment of axes without warp.

E. Shop Painting
   1. General
      a. Unless otherwise specified, shop paint all structural steel work, except those members or portions of members to be embedded in concrete or mortar. Paint embedded steel that is partially exposed

on the exposed portions and the initial 2" of embedded areas only. Do not paint contact surfaces that are to be welded or high-strength bolted with friction-type connections.

b. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.

2. Surface Preparation
   a. After inspection and before shipping, clean steelwork to be painted. Remove loose rust, millscale and spatter, slag or flux deposits. Clean steel in accordance with SSPC (Steel Structures Painting Council) as follows:
      1) SP-2 "Hand Tool Cleaning"
      2) SP-3 "Power Tool Cleaning"
      3) SP-6 "Commercial Blast Cleaning"
      4) SP-7 "Brush-off Blast Cleaning"
3. Painting
   a. Immediately after surface preparation, apply one coat structural steel primer paint in accordance with the manufacturer's instructions and at a rate to provide a minimum uniform dry film thickness of 2.0 mils for each coat. Use painting methods that will result in full coverage of joints, corners, edges, and all exposed surfaces.
   b. Visually inspect dried film for runs, sags, dry spray, overspray, embedded particles, missed and damaged areas.
   c. Repair defective or damaged areas in accordance with this specification.
   d. Field touch-up as required.
   e. Refer to Section 099000 – Painting and Coating for finish painting.

F. Drainage Holes
1. Adequate drainage holes shall be drilled to eliminate water traps. Hole diameter shall be 1/2 inch and location shall be indicated on the detail drawings. Hole size and location shall not affect the structural integrity.

G. Steel Wall Framing
1. Select members that are true and straight for the fabrication of steel wall framing. Straighten as required to provide uniform, square and true members in the completed wall framing.
2. Built-up welded door frames attached to structural steel framing. Weld exposed joints continuously and grind smooth. Plug weld steel bar stops to frames, except where shown removable. Secure removable stops to frames with countersunk, cross-recessed head machine screws, uniformly spaced not more than 10" O.C., unless otherwise shown.
3. Provide steel strap anchors welded to door frames, for tying into adjoining concrete or masonry construction, using 1/8" by 2" straps of the length required for 4" embedment; locate anchors on jambs not more than 12" from bottom of frame, and also not more than 12" from top of adjoining

concrete or masonry construction, and space anchors not more than 30" apart; unless otherwise shown.

H. Holes for Other Work
1. Provide holes required for securing other work to structural steel framing, and for the passage of other work through steel framing members, as shown on the final shop drawings. Provide threaded nuts welded to framing, and other specialty items as shown to receive other work.

PART 3 - EXECUTION

3.01 INSPECTION

A. Erector must examine the areas and conditions under which structural steel work is to be installed, and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the erector.

3.02 FABRICATION

A. Shop splices of members between field splices will be permitted only where indicated on the Contract Drawings. Splices not indicated require the approval of the Engineer.

3.03 ERECTION

A. General
1. Comply with the AISC specifications and Code of Standard Practice, and with specified requirements.

B. Temporary Shoring and Bracing
1. Provide temporary shoring and bracing members as required, with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of the structures as erection proceeds.

C. Temporary Planking
1. Provide temporary planking and working platform as required and as necessary to effectively complete the work.

D. Anchor Bolts
1. Furnish anchor bolts and other connectors required for securing structural steel to foundations and other in-place work.
2. Furnish templates and other devices as necessary for presetting bolts and other anchors to accurate locations.

E. Setting Bases and Bearing Plates

1. Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean the bottom surface of base and bearing plates.
2. Set loose and attach base plates and bearing plates for structural members on wedges, or other adjustable devices.
3. Tighten the anchor bolts after the supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding cut off flush with the edge of the base or bearing plate prior to packing with mortar.
4. Mix bedding mortar in strict accordance with the manufacturer's instructions.
5. Pack bedding mortar solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surface, protect installed materials, and allow to cure in strict compliance with the manufacturer's instructions, or as otherwise required.

F. Field Assembly

1. Set structural frames accurately to the lines and elevations indicated. Align and adjust the various members forming a part of a complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces that will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
2. Level and plumb individual members of the structure within specified AISC tolerances.
3. Establish required leveling and plumbing measurements of the mean operating temperature of the structure. Make allowances for the difference between temperature at time of erection and the mean temperature at which the structure will be when completed and in service.
4. Splice members only where shown or specified.

G. Erection Bolts

1. On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces.

H. Compliance

1. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and the removal of paint on surfaces adjacent to field welds.
2. Do not enlarge unfair holes in members by burning or by the use of draft pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.

I. Gas Cutting

1. Do not use gas cutting torches in the field for connecting fabrication errors in the structural framing, except on secondary members that are not under stress. Finish gas-cut sections equal to a sheared appearance.

J. Touch-up Painting

1. Immediately after erection, clean field welds, bolted connections, and abraded areas of the shop paint. Apply paint to exposed areas with the same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

K. Overhead, Top Running Cranes

1. Runway rails and beams shall be provided in accordance with AISC 325 and CMAA 70, except that in case of conflict, the requirements of CMAA 70 shall govern.

3.04 FIELD QUALITY CONTROL

A. Engage (at Contractor's expense) a testing laboratory to inspect high-strength bolted and welded connections and to perform tests and prepare test reports.

1. The testing laboratory shall conduct and interpret the tests and state in each report whether the test specimens comply with the requirements, and specifically state any deviations therefrom.
2. Provide access for the testing laboratory to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.
3. The testing laboratory may inspect structural steel at the plant before shipment; however, the Engineer reserves the right, at any time before final acceptance, to reject material not complying with specified requirements.

B. Correct deficiencies in structural steel work which inspections and laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests, at Contractor's expense, as may be necessary to reconfirm any non-compliance of the original work, and as may be necessary to show compliance of corrected work.

C. Shop bolted connections must be inspected by the testing laboratory, in accordance with AISC specifications.

D. Shop welding shall be inspected and tested by the testing laboratory during fabrication of structural steel, as follows:

1. Certify all welders and make inspections and tests as required. Record types and locations of all defects found in the work. Record work required and performed to correct defects.
2. Perform visual inspection of all welds.
3. Perform weld tests of the following types at the following locations: Fillet welds - 10% min. Groove welds - 100%.
   a. Magnetic Particle Inspection: Comply with ASTM E-109; performed on the root pass and on the finished weld. Do not permit cracks or zones of incomplete fusion or penetration.
   b. Radiographic Inspection: Comply with ASTM E94 and ASTM E142; with a minimum quality level of "2-2T".

E. Ultrasonic Inspection: Comply with ASTM E-164.

F. Field bolted connections must be inspected by the testing laboratory, in accordance with AISC specifications.

G. Field welding must be inspected and tested by the testing laboratory during erection of structural steel as follows:
   1. Certify all welders and make inspections and tests as required. Record types and locations of defects found in the work. Record work required and performed to correct defects.
   2. Perform visual inspection of all welds.
   3. Perform weld tests of the following types at the following locations: Fillet welds - 10%, Groove welds - 100%.
      a. Magnetic Particle Inspection: Comply with ASTM E109; performed on the root pass and on the finished weld. Do not permit cracks or zones of incomplete fusion or penetration.
      b. Radiographic Inspection: Comply with ASTM E-94 and ASTM E-142, with a minimum quality level of "2-2T".
      c. Ultrasonic Inspection: Comply with ASTM E-164.

END OF SECTION

SECTION 052000

METAL JOISTS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The extent of steel joists is shown on the Drawings, including basic layout and type of joists required. Secure all joist bridging and anchoring in place prior to the application of any construction loads. Distribute temporary loads so that joist capacity is not exceeded. Do not apply loads to bridging.

1.02 QUALITY ASSURANCE

A. Codes and Standards
The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.
1. AMERICAN WELDING SOCIETY (AWS)
   a. AWS B2.1/B2.1MSpecification for Welding Procedure and Performance Qualification
   b. AWS D1.1/D1.1M Structural Welding Code - Steel
2. STEEL JOIST INSTITUTE (SJI)
   a. SJI LOAD TABLES
3. THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)
   a. SSPC PS 14.01 Steel Joist Shop Painting System
   b. SSPC Paint 15 Steel Joist Shop Primer
4. U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)
   a. 29 CFR 1910.1200 Hazard Communication
   b. 29 CFR 1926 Safety and Health Regulations for Construction
   c. 29 CFR 1926.757 Steel Erection; Open Web Steel Joists

1.03 SUBMITTALS

A. Manufacturer's Data, Steel Joists
1. For information only, submit two copies of manufacturer's specifications and installation instructions for each type of joist and its accessories. Include manufacturer's certification that joists comply with AISC-SJI "Specifications." Indicate by transmittal form that a copy of each instruction has been distributed to the erector.

B. Shop Drawings, Steel Joists
1. Submit steel joist framing drawings. Show joist type and size, layout in plan, and erection details including methods of anchoring, framing at openings, type and spacing of bridging, requirements for field welding, and details of accessories as applicable.

2. Provide templates or location drawings for installation of anchor bolts.

1.04 REGULATORY REQUIREMENT

A. All joist and joist girder framing must conform to 29 CFR 1926.757. Secure all joist bridging and anchoring in place prior to the application of any construction loads. Distribute temporary loads so that joist capacity is not exceeded. Do not apply loads to bridging.

1.05 JOB CONDITIONS

A. Delivery, Storage and Handling
1. Deliver, store and handle steel joist as recommended in AISC-SJI "Specifications." Handle and store joists in a manner to avoid deforming members and to avoid excessive stresses.

1.06 CERTIFICATION OF COMPLIANCE

A. Prior to construction commencement, submit Material Safety Data Sheet per 29 CFR 1910.1200 for steel joists , and certification for welder qualification, compliance with AWS B2.1/B2.1M, welding operation, and tacker, stating the type of welding and positions qualified for, the code and procedure qualified under, date qualified, and the firm and individual certifying the qualification tests

PART 2 - PRODUCTS

2.01 MATERIALS

A. Joists, Joist Girders and Accessories: Provide design data from SJI Load Tables for the joist and joist girders series indicated.

B. Steel Prime Paint: Clean and prime joists in accordance with SSPC Paint 15 and SSPC PS 14.01, Steel Joist Shop Painting System, using only Type I, "Red Oxide Paint." Finish coat of paint is specified in Section 099000- Painting and Coating.

PART 3 - EXECUTION

3.01 FABRICATION

A. General
1. Fabricate steel joists in accordance with AISC-SJI "Specifications."

B. Extended Ends
1. Provide extended ends on joists where shown, complying with the manufacturer's standards and requirements of applicable AISC-SJI "Specifications" and load tables.

C. Bridging
   1. Provide horizontal or diagonal bridging for "open web" joists, complying with AISC-SJI "Specifications."

D. End Anchorages
   1. Provide end anchorages to secure joists to adjacent construction, complying with AISC-SJI "Specifications", unless otherwise indicated.

E. Shop Painting
   1. Remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories before application of shop paint.
   2. Apply one coat of steel joists primer paint to steel joists and accessories, by spray, dripping, or other method to provide continuous dry paint film thickness of not less than 0.50 mil.

3.02 INSPECTION

A. Erector must examine the areas and conditions under which steel joists are to be installed and notify contractor in writing of conditions detrimental to the proper and timely completion of work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the erector.

3.03 ERECTION

A. Place and secure steel joists in accordance with AISC-SJI "Specifications", final shop drawings, and as herein specified.

B. Placing Joists
   1. Do not start placement of steel joists until supporting work is in place and secured. Place joists on supporting work, adjust and align in accurate location and spacing before permanently fastening.
   2. Provide temporary bridging, connections, and anchors to ensure lateral stability during construction.

C. Bridging
   1. Install bridging simultaneously with joist erection, before any construction loads are applied. Anchor ends of bridging lines at top and bottom cords where terminating walls or beams.

D. Fastening Joists
   1. Field weld joists to supporting steel framework in accordance with AISC-SJI "Specifications" for the type of joists used. Coordinate welding sequence and procedure with the placing of joists.
   2. Provide unfinished threaded fasteners for bolted connections, unless otherwise indicated.
   3. Provide unfinished threaded fasteners for bolted connections except where high-strength bolts or welded connections are shown.

E. Touch-Up Painting

1. After joists installation, paint all field bolt heads and nuts, and welded areas, abraded or rusty surfaces on joists and steel supporting members. Wire brush surfaces clean with solvent before painting. Use the same type of paint as used for shop painting.

END OF SECTION

SECTION 053000

STEEL FLOOR DECKING

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The following items are specifically included without limiting the generality implied by these specifications and the drawings:
   1. Furnish and erect metal roof deck
   2. All accessories as required
   3. Shop drawings
   4. Field paint touch up

1.02 RELATED WORK

A. Section 051200 - Structural Steel Framing

B. Section 052000 - Metal Joists

C. Section 055013 - Miscellaneous Metal Fabrications

1.03 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Unless otherwise shown or specified, comply with the following standards of latest edition.
   1. AMERICAN IRON AND STEEL INSTITUTE (AISI)
      a. AISI D100 Cold-Formed Steel Design Manual
      b. AISI SG03-3 Cold-Formed Steel Design Manual Set
   2. AMERICAN WELDING SOCIETY (AWS)
      a. AWS D1.1/D1.1MStructural Welding Code - Steel
      b. AWS D1.3/D1.3MStructural Welding Code - Sheet Steel
   3. STEEL DECK INSTITUTE (SDI)
      a. SDI 31 Design Manual for Composite Decks, Form Decks, and Roof Decks
      b. SDI DDMO3 Diaphragm Design Manual; 3rd Edition
      c. SDI DDP Deck Damage and Penetrations
      d. SDI MOC2 Manual of Construction with Steel Deck.
   4. ASTM INTERNATIONAL (ASTM)
      a. ASTM A 1008/A 1008M Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardened
      b. ASTM A 123/A 123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

c. ASTM A 653/A 653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
d. ASTM A 780/A 780M Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

1.04 SUBMITTALS

A. Shop drawings shall include erection plans and details; deck type accessories; factory finish; welding patterns and instructions; installation instructions, and design criteria.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver deck units to the site in a dry and undamaged condition. Store and handle steel deck in a manner to protect it from corrosion, deformation, and other types of damage. Do not use decking for storage or as working platform until units have been fastened into position. Exercise care not to damage material or overload decking during construction. Must not exceed the design live load. The maximum uniform distributed storage load. Stack decking on platforms or pallets and cover with weathertight ventilated covering. Elevate one end during storage to provide drainage. Maintain deck finish at all times to prevent formation of rust. Repair deck finish using touch-up paint. Replace damaged material.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Sheet steel for roof and floor deck shall conform to ASTM A653, with a minimum yield strength of 33 ksi.

B. Floor Decks
1. Conform to ASTM A 653/A 653M or ASTM A 1008/A 1008M for composite deck assembly. Fabricate deck used as the tension reinforcing in composite deck of 20 gauge design thickness or thicker steel Zinc-coat in conformance with ASTM A 653/A 653M, G90 coating class.
a. In addition to resisting shear, provide devices to resist vertical separation between the steel deck and the concrete. Provide one of the following types of shear devices:
b. Mechanically fixed shear devices such as embossments, holes, or welded buttons.
c. Mechanically or powder-actuated devices such as inverted, triangular or L-shaped ribs.
2. Composite Floor Deck shall be 20 gauge, 2" deep, Type VLI galvanized in accordance with ASTM A653. Metal surfaces shall have been cleaned in a Tri-Sodium Phosphate wash and per ASTM A446.
3. Length of Floor Deck Units: Provide floor deck units of sufficient length to span three or more spacings where possible.

4. Weld composite floor deck to floor framing at end panel and at intermediate supports with ½" diameter plug welds spaced maximum 12" o.c. along supporting members. One weld must be located at each side of panel at supports.

C. Roof Decks
1. Conform to ASTM A 792/A 792M or ASTM A 1008/A 1008M for deck used in conjunction with insulation and built-up roofing. Fabricate roof deck units of 20 gauge design thickness or thicker steel and zinc-coated in conformance with ASTM A 653/A 653M, G90 coating class.
2. Roof Deck shall be 20 gauge, 1½" deep, Type B galvanized in accordance with ASTM A653. Metal surfaces shall have been cleaned in a Tri-Sodium Phosphate wash and per ASTM A446.

D. Deck shall be as supplied by Roof Deck Inc., United Steel Deck, Vulcraft, Roll-Form Products or Bowman Construction Products.

E. ACCESSORIES
1. Provide accessories of same material as deck, unless specified otherwise. Provide manufacturer's standard type accessories, as specified.

F. FINISH
1. Galvanizing shall conform to ASTM A653.

PART 3 - EXECUTION

3.01 ERECTION

A. EXAMINATION
1. Prior to installation of decking units and accessories, examine worksite to verify that as-built structure will permit installation of decking system without modification.

B. INSTALLATION
1. Attachment
a. Immediately after placement and alignment, and after correcting inaccuracies, permanently fasten steel deck units to structural supports and to adjacent deck units by welding with normal 5/8 inch diameter puddle welds [or fastened with screws, powder-actuated fasteners, or pneumatically driven fasteners] as indicated on the design drawings and in accordance with manufacturer's recommended procedure[and SDI 31]. Clamp or weight deck units to provide firm contact between deck units and structural supports while performing welding [or fastening]. [Anchoring the deck to structural supports with powder-actuated fasteners or pneumatically driven fasteners is prohibited.] Attachment of adjacent deck units by button-punching is prohibited.

1) Welding

Perform welding in accordance with AWS D1.3/D1.3M using methods and electrodes recommended by the manufacturers of the base metal alloys being used. Ensure only operators previously qualified by tests prescribed in AWS D1.1/D1.1M and AWS D1.3/D1.3M make welds. Immediately recertify, or replace qualified welders, that are producing unsatisfactory welding. Conform to the recommendations of the Steel Deck Institute and the steel deck manufacturer]for location, size, and spacing of fastening. Do use welding washers at the connections of the deck to supports. Do not use welding washers at sidelaps. Holes and similar defects will not be acceptable. Lap 2 inch deck ends. Attach all partial or segments of deck units to structural supports in accordance with Section 2.5 of SDI DDMO3. Immediately clean welds by chipping and wire brushing. Heavily coat welds, cut edges and damaged portions of coated finish with zinc-dust paint conforming to ASTM A 780/A 780M.

2) Fastening Floor Deck Units

Fasten floor deck units to the steel supporting members at ends and at all intermediate supports, both parallel and perpendicular to deck span, by welds. Do not exceed spacing of welds of 12 inch on center, with a minimum of two welds per floor deck unit at each support. Provide 3/4 inch minimum diameter fusion welds. Coordinate welding sequence and procedure with the placing of the floor deck units. Blow holes shall be cause for rejection.

Lock sidelaps between adjacent floor deck units together at intervals not exceeding 48 inch on center by welding or button punching for all spans.

2. Openings

a. Cut or drill all holes and openings required and be coordinated with the drawings, specifications, and other trades. Frame and reinforce openings through the deck in conformance with SDI DDP. Reinforce holes and openings 6 to 12 inch across by 0.0474 inch thick steel sheet at least 12 inch wider and longer than the opening and be fastened to the steel deck at each corner of the sheet and at a maximum of 6 inch on center. Reinforce holes and openings larger than 12 inch by steel channels or angles installed perpendicular to the steel joists and supported by the adjacent steel joists. Install steel channels or angles perpendicular to the deck ribs and fasten to the channels or angles perpendicular to the steel joists. Deck manufacturer shall approve holes or openings larger than 6 inch in diameter prior to drilling or cutting. Openings must not interfere with seismic members such as chords and drag struts.

3. Deck Damage
    a. SDI MOC2, for repair of deck damage.
4. Concrete Work
    a. Prior to placement of concrete, inspect installed decking to ensure that there has been no permanent deflection or other damage to decking. Replace decking which has been damaged or permanently deflected as approved by the Contracting Officer. Place concrete on metal deck in accordance with Construction Practice of SDI 31.

C. JOINT SEALING FOR ROOF DECKS
1. Seal sidelaps and endlaps with manufacturer's recommended joint sealing material. Shop or field apply the material. Before applying the sealing material, completely remove dust, dirt, moisture, and other foreign material from the surfaces to which the sealing material is to be applied. Apply sealing material in strict accordance with the sealing material manufacturer's printed instructions.

D. ROOF SUMP PANS
1. Place sump pans over openings in roof decking and fusion welded to top surface of roof decking. Do not exceed spacing of welds of 12 inch with not less than one weld at each corner. Field cut opening in the bottom of each roof sump pan to receive the roof drain as part of the work of this section.

E. FIELD QUALITY CONTROL
1. Decks Not Receiving Concrete
    a. Inspect the decking top surface for distortion after installation. For roof decks not receiving concrete, verify distortion by placing a straight edge across three adjacent top flanges. The maximum allowable gap between the straight edge and the top flanges is 1/16 inch; when gap is more than 1/16 inch, provide corrective measures or replacement. Reinspect decking after performing corrective measures or replacement.

END OF SECTION

SECTION 055013

MISCELLANEOUS METAL FABRICATIONS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Loose steel lintels.
   2. Steel angle supports at roof deck openings.
   3. Fish bin.
   4. Rolling platform.

B. Related Requirements:
   1. Section 053000 – Steel Floor Deck.

1.02 REFERENCE STANDARDS

A. ASTM International:
   1. ASTM A36 - Standard Specification for Carbon Structural Steel.
   2. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
   3. ASTM A780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
   4. ASTM A992 - Standard Specification for Structural Steel Shapes.
   5. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.

1.03 SUBMITTALS

A. Shop Drawings: Indicate profile, size, steel grade.

1.04 QUALITY ASSURANCE

A. Perform Work according to AISC Manual of Steel Construction.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Inspection: Accept metal fabrications on-Site in labeled shipments. Inspect for damage.

B. Protect metal fabrications from damage by exposure to weather or by ground contact.

1.06 EXISTING CONDITIONS

A. Field Measurements: Verify field measurements prior to fabrication. Indicate field measurements on Shop Drawings.

PART 2 - PRODUCTS

2.01 LINTELS

A. Description:
   1. Size and Configuration:
      a. As indicated on Drawings.
      b. Length to allow 6 inch minimum bearing on both sides of opening.
   2. Finish: Hot dip galvanized.

2.02 MATERIALS

A. Steel:
   1. Angles: ASTM A36

2.03 FABRICATION

A. Fit and shop-assemble items in largest practical sections for delivery to Site.

B. Fabricate items with joints tightly fitted and secured.

C. Fabrication Tolerances:
   1. Squareness: 1/8 inch maximum difference in diagonal measurements.
   2. Maximum Offset between Faces: 1/16 inch.
   3. Maximum Misalignment of Adjacent Members: 1/16 inch.
   4. Maximum Bow: 1/8 inch in 48 inches.
   5. Maximum Deviation from Plane: 1/16 inch in 48 inches.

2.04 FINISHES

A. Steel:
   1. Galvanizing: ASTM A123; hot-dip galvanize after fabrication.
   2. Touchup Primer for Galvanized Surfaces:
      a. SSPC Paint 20, Type I – Inorganic.
      b. ASTM A780.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive Work.

3.02 INSTALLATION

A. Install items plumb and level, accurately fitted, and free from distortion or defects.

B. Make provisions for erection stresses. Install temporary bracing to maintain alignment until permanent bracing and attachments are installed.

C. Obtain approval of Architect/Engineer prior to Site cutting or making adjustments not scheduled.

3.03 TOLERANCES

A. Maximum Variation from Level: 1/16 inch in 3 feet Maximum Offset from Alignment: 1/4 inch.

B. Maximum Out-of-Position: 1/4 inch.

3.04 FIELD QUALITY CONTROL

A. After erection, touch up damaged finishes with galvanizing repair paint to match shop finishes.

B. Touch up factory-applied finishes according to manufacturer-recommended procedures.

END OF SECTION

SECTION 075403 - SHEET MEMBRANE ROOFING - FULLY ADHERED

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Self adhered vapor retarder.
2. Rigid insulation and overlayment board.
3. Base flashings.
4. Cant strips.
5. Sheet membrane roofing.

1.02 REFERENCE STANDARDS

A. ASTM International:
1. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
2. ASTM C1177 - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
3. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
4. ASTM C1371 - Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers.
5. ASTM C1549 - Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer.
6. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
7. ASTM D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
8. ASTM D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact.
9. ASTM D822 - Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
10. ASTM D1004 - Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting.
11. ASTM D4637 - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane.
12. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
13. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
14. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings.
15. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

16. ASTM E408 - Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques.
17. ASTM E903 - Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres.
18. ASTM E1918 - Standard Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field.
19. ASTM E1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.

B. FM Global:
1. FM DS 1-28 - Wind Design.
2. FM 4450 - Approval Standard for Class 1 Insulated Steel Deck Roofs.

C. Intertek Testing Services (Warnock Hersey Listed):
1. WH - Certification Listings.

D. National Roofing Contractors Association:
1. NRCA - The NRCA Roofing and Waterproofing Manual.

E. Single Ply Roofing Institute:
1. SPRI ES-1 - Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.

F. UL:
1. UL - Fire Resistance Directory.
2. UL 790 - Standard Test Methods for Fire Tests of Roof Coverings.
3. UL 1256 - Fire Test of Roof Deck Constructions.
4. UL 1897 - Uplift Tests for Roof Covering Systems.

1.03 COORDINATION

A. Coordinate Work of this Section with installation of associated roof penetrations and metal flashings.

1.04 PREINSTALLATION MEETINGS

A. Convene minimum one week prior to commencing Work of this Section.

B. Review preparation and installation procedures and coordinating and scheduling of related Work.

1.05 SUBMITTALS

A. Product Data: Submit characteristics of membrane materials, adhesives, seaming materials, flashing materials, insulation, and vapor retarders.

B. Shop Drawings:
   1. Indicate setting plan for tapered insulation, joint and termination detail conditions, and conditions of interface with other materials.

C. Manufacturer's Certificate:
   1. Certify that products meet or exceed specified requirements.

D. Field Quality-Control Submittals:
   1. Indicate results of Contractor-furnished tests and inspections.

E. Manufacturer Reports:
   1. Manufacturer to perform site visits to verify preparation and installation meets manufacturer’s requirements for warranty.

F. Qualifications Statements:
   1. Submit qualifications for manufacturer and applicator.

1.06 QUALITY ASSURANCE

A. Roof Assembly Fire Classification:
   1. Minimum Class A when tested according to UL 790.

B. Surface Burning Characteristics:
   2. Foam Insulation: Maximum 75/450 flame-spread/smoke-developed index when tested according to ASTM E84.

C. Apply label from agency approved by authority having jurisdiction to identify each roof assembly component.

D. Manufacturer's Inspection:
   3. Furnish manufacturer services before start of Work of this Section to verify substrate acceptability and review installation procedures and completed Work, such that specified warranty can be issued.
   4. Promptly and satisfactorily repair unsatisfactory conditions disclosed by manufacturer's Site visits.

1.07 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum ten years' documented experience.

B. Applicator: Company specializing in performing Work of this Section with minimum five years' documented experience and approved by manufacturer.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

B. Deliver products in manufacturer's original containers, dry, undamaged, and with seals and labels intact.

C. Store products in weather protected environment, clear of ground and moisture.

D. Protect materials, except membrane, from direct exposure to sunlight, between 60 and 80 degrees F.

E. Store solvent containing materials in well ventilated areas with proper fire and safety precautions.

1.09 AMBIENT CONDITIONS

A. Do not apply roofing membrane during inclement weather or ambient temperatures below 60 degrees F or above 80 degrees F without proper weather protection.

B. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.

1.10 WARRANTY

A. Furnish 20-year manufacturer's warranty, including coverage of both labor and material with no dollar limitation, including 90 MPH uplift warranty and 16 hours of puncture repair per year.

PART 2 - PRODUCTS

2.01 DESCRIPTION

A. Sheet Membrane Roofing System: One-ply sheet membrane system with vapor retarder, insulation, overlayment board, and adhesive-applied membrane.

2.02 SINGLE PLY ROOFING - FULLY ADHERED

A. Manufacturer List:
   1. Carlisle Syntec.
   2. Firestone.
   3. Tremco.
   4. Or approved equal.

B. Sheet Vapor Retarder:
   1. Self-adhering air and vapor barrier, 40 mil composite:
   2. Comply with UL requirements.

3. Materials: 32 mil rubberized self-adhering asphalt laminated to 8 mil polyester fabric.
4. Primer: Single component water-based primer designed for use with approved vapor retarder.

C. Gypsum Sheathing:
1. Fiberglass mat-faced, noncombustible gypsum core panel.
2. Tested in accordance with ASTM E136.
3. Thickness: ½ inch.

D. Insulation:
1. Cellulose Fiber Board Facers Each Side.
2. Closed cell polyisocyanurate foam core.
3. Tapered 4’ x 4’ or 4’ x 8’ panels sloped at 1/8” per foot.
4. FM Class 1 and UL Class A rating.
5. ASTM C-1289, Type II, Class 1, Grade 3, 20 PSI minimum.

E. Flexible Flashings:
1. Material: EPDM.
2. Color: Black.

F. Membrane:
1. Material:
a. EPDM Rubber: Comply with ASTM D4637, Type I (non-reinforced), 0.60” thickness.

G. Lap Sealants: As recommended by membrane manufacturer.

H. Washer Disc: Membrane material with adhesive backing.

I. Adhesive Materials:
1. As recommended by manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and Site conditions are ready to receive Work.

B. Verify that deck is supported and secure.

C. Verify that deck is clean and smooth, free of depressions, waves, or projections, and suitable for installation of roof system.

D. Verify that substrate is acceptable to membrane manufacturer.

E. Verify that deck surfaces are dry and free of snow or ice.

F. Verify that roof openings, curbs, pipes, sleeves, ducts, and vents are solidly set and that wood nailing strips and reglets are in place.

3.02 PREPARATION

A. Steel Deck:
   1. Verify that steel deck joints are flat and tight.
   2. Mechanically fasten sheathing to roof deck according to FM.

3.03 APPLICATION

A. Vapor Retarder:
   1. Apply vapor retarder to sheathing surface with adhesive.
   2. Extend vapor retarder under blocking to deck edge.

B. Insulation Application:
   1. Ensure that vapor retarder is clean and dry.
   2. Mechanically fasten insulation to deck.
   3. Place second layer of insulation with joints staggered 6 inches from joints of first layer.
   4. Place tapered thickness insulation to required slope pattern.
   5. Minimum Total Insulation Thickness: As required to achieve insulation R-value of 30.
   6. Lay boards with edges in moderate contact without forcing.
   7. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
   8. Lay tapered boards for distance of 18 inches back from roof drains for positive drainage.
   9. Apply no more insulation than can be covered with membrane in same day.

C. Membrane Application:
   1. Apply primer.
   2. Install according to manufacturer's printed instructions.
   3. Apply adhesive at rate of 1 gal per 250 square feet.
   4. Roll out membrane, free from air pockets, wrinkles, or tears, and firmly press sheet into place without stretching.
   5. Bond sheet to substrate..
   6. Sealing:
      a. Overlap edges and ends and seal by contact tape, minimum 6 inches.
      b. Seal to make membrane permanently waterproof.
      c. Apply uniform bead of sealant to joint edge.
   7. Shingle joints on sloped substrate in direction of drainage.
   8. Extend membrane up a minimum of 8 inches onto vertical surfaces.
   9. Seal membrane around roof penetrations.

D. Flashings and Accessories:
   1. Apply flexible flashings to seal membrane to vertical elements.
   2. Secure to nailing strips at 8 inches o.c. and reglets.
   3. Coordinate installation of roof drains and related flashings.
   4. Seal flashings and flanges of items penetrating membrane.
   5. Pads:
      a. Install walkway pads.
      b. Space pad joints to permit drainage.

3.04 CLEANING

A. Where finished surfaces are soiled by Work of this Section, consult surfaces manufacturer for cleaning advice and conform to manufacturer's documented instructions.

B. Repair or replace defaced or disfigured finishes caused by Work of this Section.

3.05 PROTECTION

A. Protect building surfaces against damage from roofing Work.

B. Do not permit traffic over unprotected floor surfaces.

END OF SECTION

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Copings and counterflashings.

B. Related Requirements:
   1. Section 061000 - Rough Carpentry.
   2. Section 079000 - Joint Protection: Sealants and sealers.

1.02 REFERENCE STANDARDS

A. Aluminum Association:
   1. AA - Designation System for Aluminum Finishes.

B. American Architectural Manufacturers Association:
   1. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
   2. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
   3. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

C. ASTM International:
   1. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

D. National Roofing Contractors Association:
   1. NRCA - Construction Details Manual.

E. Sheet Metal and Air Conditioning Contractors' National Association:
   1. SMACNA - Architectural Sheet Metal Manual.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer information regarding components metal types, finishes, and characteristics.

B. Fabricator's Certificate: Certify that products meet or exceed specified requirements.

C. Qualifications Statements:
   1. Submit qualifications for fabricator and installer.

1.04 QUALITY ASSURANCE

A. Perform Work according to SMACNA standards.

1.05 QUALIFICATIONS

A. Fabricator: Company specializing in fabricating products specified in this Section with minimum five years' experience.

B. Installer: Company specializing in performing Work of this Section with minimum five years' experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

B. Storage:
   1. Store materials according to manufacturer instructions.
   2. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation.
   3. Slope metal sheets to ensure drainage.

C. Protection:
   1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
   2. Prevent contact with materials that may cause discoloration or staining.
   3. Provide additional protection according to manufacturer instructions.

PART 2 - PRODUCTS

2.01 SHEET METAL FLASHING AND TRIM

A. Performance and Design Criteria:
   1. Sheet Metal Flashings: Comply with following criteria of SMACNA Manual.

2.02 MATERIALS

A. Prefinished Aluminum Sheet:
   1. Description: Alloy and temper as required for application and finish.
   2. Comply with ASTM B209.
   3. Thickness:
      a. 0.032 inch, 0.040 inch for coping.

4. Coating:
    a. Shop precoated with Kynar.
    b. Color: As selected by Owner from manufacturer's standard.

2.03 FABRICATION

A. Form section shapes as indicated on Drawings, accurate in size, square, and free from distortion or defects.

B. Fabricate cleats of same material as sheet metal, interlocking with sheet.

C. Form pieces in longest possible lengths.

D. Hem exposed edges on underside 1/2 inch.

E. Miter and seam corners.

F. Forming:
1. Form material with seams in accordance with SMACNA standards, except where otherwise indicated.
2. At moving joints, use sealed, lapped, bayonet-type, or interlocking hooked seams.

G. Corners:
1. Fabricate corners from one piece with minimum 18-inch long legs.
2. Seam for rigidity and seal with sealant.

H. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

I. Flashings:
1. Fabricate flashings to allow toe to extend 2 inches over roofing.
2. Return and brake edges.

J. Fabricate accessories in profile and size to suit gutters and downspouts, as follows:
1. Anchorage Devices: Comply with SMACNA requirements.

K. Seal metal joints.

2.04 FINISHES

A. Coating:
1. Material: Kynar.

B. Washcoat: Finish concealed side of metal sheets with washcoat compatible with finish system, as recommended by finish system manufacturer.

2.05 ACCESSORIES

A. Fasteners: Corrosion resistant fasteners as recommended by manufacturer.

B. Sealant:
   1. Type: Silicone.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets are in place, and nailing strips have been located.

B. Verify that roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

A. Install starter strips, edge strips, and cleats before starting installation of sheet metal flashing and trim.

3.03 INSTALLATION

A. Recessed Flashing Reglets:
   1. Insert counterflashings into existing reglets to form tight fit.
   2. Secure in place with wedges.
   3. Seal flashings into reglets with sealant.
   4. Fit flashings tight in place, and make corners square, surfaces true and straight in planes, and lines accurate to profiles.
   5. Seal metal joints watertight.

B. Copings:
   1. Install concealed cleat fastened to wood blocking at the exterior side of the parapet wall.
   2. Clip coping into concealed cleat and fasten with gasketed fastener at interior side of parapet wall.
   3. Fit copings in place, and make corners square, surfaces true and straight in planes, and lines accurate to profiles.
   4. Seal metal joints watertight.

END OF SECTION

SECTION 079000

JOINT PROTECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Sealants and joint backing.
   2. Accessories.

1.02 REFERENCE STANDARDS

A. ASTM International:
   1. ASTM C 661 - Standard Test Method for Indentation Hardness of Elastomeric Type Sealants by Means of a Durometer.
   2. ASTM C 719 - Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants under Cyclic Movement (Hockman Cycle).
   3. ASTM C 920 - Specification for Elastomeric Joint Sealants.
   4. ASTM C 1135 - Standard Test Method for Determining Tensile Adhesion Properties of Structural Sealants.
   5. ASTM C 1184 - Standard Specification for Structural Silicone Sealants.
   6. ASTM C 1193 - Standard Guide for Use of Joint Sealants.
   7. ASTM C 1248 - Test Method for Staining of Porous Substrate by Joint Sealants.
   8. ASTM C 1330 - Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
   9. ASTM D 2240 - Standard Test Method for Rubber Property - Durometer Hardness.
   10. ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension.

B. Sealant, Waterproofing, and Restoration Institute (SWRI): www.swrionline.org:
   1. SWRI Validation Program.

1.03 SUBMITTALS

A. Product Data: For each type of joint sealant product specified, including:
   1. Preparation instructions and recommendations.
   2. Standard drawings illustrating manufacturer's recommended sealant joint profiles and dimensions applicable to Project.

B. Joint Sealant Schedule: Indicate joint sealant location, joint sealant type, manufacturer and product name, and color, for each application. Utilize joint sealant designations included in this Section.

C. Samples for Color Selection: For each joint sealant type.

D. Samples for Verification: For each exterior joint sealant product, for each color selected.

E. INFORMATIONAL SUBMITTALS
   1. Qualification Data: For qualified applicator.
   2. Sealant, Waterproofing, and Restoration Institute (SWRI) Validation Certificate: For each sealant specified to be validated by SWRI's Sealant Validation Program.
   3. Preconstruction compatibility and adhesion test reports.
   4. Preconstruction field-adhesion test reports.
   5. Field quality control adhesion test reports.
   6. Warranty: Sample of unexecuted manufacturer and installer special warranties.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Experienced Installer equipped and trained for application of joint sealants required for this Project with record of successful completion of projects of similar scope.

B. Single Source Responsibility: Provide exterior joint sealants by a single manufacturer responsible for testing of Project substrates to verify compatibility and adhesion of joint sealants.

C. Preconstruction Field-Adhesion Testing: Prior to installing joint sealants, field test adhesion to joint substrates using ASTM C 1193 Method A or method recommended by manufacturer. Verify adhesion is adequate. Modify joint preparation recommendations for failed joints and re-test. Submit written report to ENGINEER.

D. Mockups: Provide joint sealant application within mockups required in other sections identical to specified joint sealants and installation methods.
   1. Warranty Period for Silicone Sealants: 20 years date of Substantial Completion.

1.05 MOCKUPS

A. Construct mockup of sealant joints at each location using up to three colors selected from the samples.

B. Construct mockup with specified sealant types and with other components as indicated.

C. Preparation and Priming:
   1. Determine requirements based on manufacturer recommendations.
   2. Correct failure of sealant tests on mockup if required.

D. Verify that sealants, primers, and other components do not stain adjacent materials.

E. Locate mock-up at an easily accessible area that can be seen from the ground.

F. Incorporate accepted mockup as part of Work. Remove mock-ups that were not accepted.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

B. Store products according to manufacturer instructions.

C. Protection:
   1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
   2. Provide additional protection according to manufacturer instructions.

1.07 FIELD CONDITIONS

A. Hazardous Materials: No hazardous materials are known to be present on site.
   1. If suspected hazardous materials are encountered, do not disturb materials, and immediately notify ENGINEER and OWNER.

B. Maintain temperature and humidity as recommended by sealant manufacturer during and after installation.

1.08 WARRANTY

A. Special Installer's Warranty: Original statement on Installer's letterhead in which Installer agrees to repair or replace joint sealants that demonstrate deterioration or failure within warranty period specified.
   1. Warranty Period: Two years from date of Substantial Completion.
   2. Include coverage for:
      a. Installed sealants and accessories failing to achieve watertight seal.
      b. Installed sealants and accessories exhibiting loss of adhesion or cohesion.
      c. Sealants that do not cure.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint sealant manufacturer agrees to furnish joint sealants to repair or replace those that demonstrate deterioration or failure under normal use within warranty period specified.

PART 2 - PRODUCTS

2.01 JOINT SEALERS

A. Manufacturers:
   1. Dow Corning Corporation
      a. 2200 W. Salzburg Street P.O. Box 994 Midland MI 48686–0994
      b. Phone: (800) 248-2481
   2. Sika Corporation
      a. 201 Polito Avenue Lyndhurst NJ 07071
      b. Phone: 800-933-8800
   3. Tremco Incorporated
      a. 3735 Green Road Beachwood OH 44122
      b. Phone: 800.321.7906
   4. GE Construction Sealants
      a. 9930 Kincey Ave Huntersville NC 28078
      b. Phone: 877-943-7325

2.02 JOINT SEALERS BY APPLICATION

A. High-Performance General-Purpose Exterior (Nontraffic) Sealant:
   1. Material: Silicone
   2. Comply with ASTM C920, Grade NS, Class 25, Uses M, G, and A.
   3. Type: Single component.
   4. Color: As selected.
   5. Applications:
      a. Control, expansion, and soft joints in masonry.
      b. Joints between metal frames and other materials.
      c. Other exterior nontraffic joints for which no other sealant is indicated.

2.03 ACCESSORIES

A. Primer:
   1. Type: Non-staining.
   2. As recommended by sealant manufacturer to suit application.

B. Joint Cleaner:
   1. Type: Non-corrosive and non-staining.
   2. As recommended by sealant manufacturer.
   3. Compatible with joint forming materials.

C. Joint Backing:
   1. Description: Round foam rod, compatible with sealant.
   2. Comply with ASTM D1667.
   3. Size: Oversized 30 to 50 percent larger than joint width.

D. Bond Breaker:
   1. Description: Pressure-sensitive tape.
   2. As recommended by sealant manufacturer to suit application.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces and joint openings are ready to receive Work of this Section.

B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

A. Comply with ASTM C1193.

B. Remove loose materials and foreign matter that could impair adhesion of sealant.

C. Clean and prime joints.

D. Protect elements surrounding Work of this Section from damage or disfiguration.

3.03 APPLICATION

A. Comply with ASTM C1193.

B. Measure joint dimensions and size joint backers to achieve following:
   1. Width to Depth Ratio: 2:1.
   2. Neck Dimension: No greater than 1/2 of joint width.
   3. Surface Bond Area on Each Side: Not less than 75 percent of joint width.

C. Install bond breaker where joint backing is not used.

D. Apply sealant free of air pockets, foreign embedded matter, ridges, and sags.

E. Joint Tooling: Concave.

3.04 CLEANING

A. Clean adjacent soiled surfaces.

3.05 PROTECTION

A. Protect sealants until cured.

END OF SECTION

SECTION 081110

METAL DOORS AND FRAMES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Steel doors and frames; fire rated steel doors and frames.

B. Related Requirements:

C. Section 087100 – Door Hardware

1.02 SUBMITTALS

A. Shop Drawings: Indicate door and frame elevations, internal reinforcement, cut-outs for glazing, louvers, and finishes.

B. Product Data: Submit door and frame configurations, location of cut-outs for hardware reinforcement.

C. Samples: Submit two samples of metal, door frame and door face, 2x2 inch in size illustrating shop finish colors and surface texture.

1.03 QUALITY ASSURANCE

A. Perform Work in accordance with the following:
   1. ANSI 250.8 - Recommended Specifications for Standard Steel Doors and Frames.
   2. DHI - Door Hardware Institute - The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.

B. Fire Rated Door Construction: Conform to NFPA 252.

C. Installed Fire Rated Door Assembly: Conform to NFPA 80 for fire rated class as indicated on Drawings.

D. Attach label from agency approved by authority having jurisdiction to identify each fire rated door.

E. Surface Burning Characteristics:
   1. Foam Insulation: Maximum 75/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

F. Apply label from agency approved by authority having jurisdiction to identify each foam plastic insulation material.

G. Perform Work in accordance with NY State Building Codes.

PART 2 - PRODUCTS

2.01 STEEL DOORS AND FRAMES

A. Manufacturers:
   1. Amweld Building Products, Inc.
   2. Pioneer Industries
   3. Ceco Door

B. Product Description: Standard shop fabricated steel doors, and frames; fire rated and non-rated types; flush face or stile and design.

2.02 COMPONENTS

A. Exterior Doors (Non-Rated): ANSI A250.8, 1-3/4 inch thick.
   1. Level 3 – Extra Heavy Duty, Model 2, seamless design, continuously welded seam.

B. Exterior Frames.
   1. Level 3 – Extra Heavy Duty, nominal 14 gage thick material, base metal thickness.

C. Door Core: Insulated: polystyrene foam, R-value of 7, measured in accordance with ASTM E413. Non-insulated: vertical steel stiffeners with fiberglass acoustic insulation.

D. End Closure: Channel, flush.

E. Sound Rated Door: STC of 26, measured in accordance with ASTM E413.

2.03 HARDWARE AND ACCESSORIES

A. General: Provide hardware that is manufactured for extra strength for use in institutional and high traffic applications, fabricated from aluminum, stainless steel, or other corrosion-resistant material compatible with aluminum; designed to smoothly operate, tightly close, and secure doors, as follows:
   1. Refer to Section 087100 – Door Hardware, in addition to the requirements listed in this section.

B. Hardware furnished by other manufacturers to be installed on the doors shall be installed by either the door manufacturer or the door installer according to the hardware manufacturer's requirements.

C. Weatherstripping: Meeting stiles on pairs of doors shall be equipped with an adjustable astragal utilizing wool pile with polymeric fin. The perimeter door weatherstripping on single acting doors (single or pairs) shall be bulb polymeric

weatherstripping in door frames. This is comprised of a thermoplastic elastomer on a tubular shape with a semi-rigid polymeric backing.

D. Sill Sweep Strips: EPDM blade gasket sweep strip in an aluminum extrusion applied to the interior exposed surface of the bottom rail with concealed fasteners (Necessary to meet specified performance tests).

E. Threshold: 1/2” by 4” Threshold: stainless steel ADA compliant with ribbed surface, anchored to floor with suitable fasteners.

F. Astragals for Double Doors: Steel, Z or T shaped, specifically for double doors.

G. Silencers: Resilient rubber fitted into drilled hole, three per frame.

2.04 FABRICATION

A. Fabricate doors and frames with hardware reinforcement welded in place. Protect frame hardware preparations with mortar guard boxes.

B. Attach astragal to inactive leaf of pairs of fire rated doors.

C. Fabricate frames as knock down units for field assembly.

D. Fabricate frames to suit masonry wall coursing with 4 inches head member.

E. Reinforce frames wider than 48 inches with roll formed steel channels fitted tightly into frame head, flush with top.

F. Prepare interior frames for silencers and install.

G. Frame Mullions for Double Doors: Removable type, with profile matching jambs.

H. Attach fire rating label to each fire rated door and frame.

2.05 SHOP FINISHING

A. Steel Sheet: Galvanized to ASTM A653/A653M G90 coating class.

B. Primer: Baked.

C. Shop Finish: Baked enamel.

D. Coat inside of frame profile with bituminous coating.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify opening sizes and tolerances are acceptable.

3.02 INSTALLATION

A. Install doors and frames in accordance with ANSI A250.8.

B. Coordinate door frames with wall construction for frame anchor placement.

C. Install roll formed steel reinforcement channels between two abutting frames. Anchor to structure and floor.

D. Install door louvers plumb and level.

E. Adjust door for smooth and balanced door movement.

F. Tolerances:
   1. Maximum Diagonal Distortion: 1/16 measured with straight edge, corner to corner.

END OF SECTION

SECTION 083323

OVERHEAD COILING DOORS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes overhead coiling door, operating hardware, electric operation.
   1. Provide wiring from electric circuit disconnect to door operator to control station.

B. Related Sections:
   1. Section 099000 - Painting and Coating

1.02 REFERENCES

A. ASTM International:
   1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   2. ASTM A666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
   3. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
   4. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

B. Intertek Testing Services (Warnock Hersey Listed):
   1. WH - Certification Listings.

C. National Electrical Manufacturers Association:
   1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
   2. NEMA ICS 2 - Industrial Control and Systems: Controllers, Contactors, and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC.
   3. NEMA MG 1 - Motors and Generators.

D. Underwriters Laboratories Inc.:
   1. UL - Building Materials Directory.
   2. UL 10B - Fire Tests of Door Assemblies.
   3. UL 325 - Door, Drapery, Gate, Louver, and Window Operators and Systems.

1.03 SYSTEM DESCRIPTION

A. Electric Operation: Electric motor operated unit with manual override in case of power failure.

1.04 DESIGN REQUIREMENTS

A. Wind Loads: Design door assembly to withstand wind/suction load of 20 psf, with maximum deflection of 1/120, and without damage to door or assembly components.

B. Operation: Design door assembly including operator, to operate for not less than 20,000 cycles and 10 cycles per day.

1.05 SUBMITTALS

A. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.

B. Product Data: Submit general construction, component connections and details, wiring diagram and electrical equipment.

C. Samples: Submit samples of door slat material, in manufacturer’s standard size, illustrating shape, color and finish texture.

D. Manufacturer's Installation Instructions: Indicate installation sequence and procedures, and adjustment and alignment procedures.

1.06 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Submit lubrication requirements and frequency, and periodic adjustments required.

1.07 QUALITY ASSURANCE

A. Products Requiring Electrical Connection: Listed and classified by UL or another testing firm acceptable to authority having jurisdiction.

B. Surface Burning Characteristics:
   1. Foam Insulation: Maximum 75/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

C. Apply label from agency approved by authority having jurisdiction to identify each foam plastic insulation board.

D. Perform Work in accordance with New York State Building Code – latest revision standard.

1.08 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five (5) years documented experience.

B. Installer: Company specializing in performing work of this section with minimum five (5) years documented experience approved by manufacturer.

PART 2 - PRODUCTS

2.01 OVERHEAD COILING DOORS

A. Manufacturers:
   1. McKeon Rolling Steel Door Company, Inc.
   2. Overhead Door Corporation.
   3. Wayne-Dalton Corp.

B. Furnish materials in accordance with New York State and local standards.
   1. Electric Operation: Electric motor operated unit with manual override in case of power failure.

2.02 COMPONENTS

A. Curtain: Conform to following:
   1. Steel Slats: Interlocking, minimum 24 gauge of ASTM A653/A653M steel, minimum galvanized coating designation G90 coating class.
      a. Type: Sandwich slat construction with insulated core filled with CFC-free foamed in place polyurethane.
         1) R-value: 7.7.
         2) Sound Rating: STC-21.
   2. Nominal Slat Size: 2 inches wide by required length.
   3. Slat Ends: Each slat fitted with end locks to act as wearing surface in guides and to prevent lateral movement.
   4. Curtain Bottom: Fitted with angles, channels, or tubes to provide reinforcement and positive contact with floor in closed position.

B. Guides: Minimum 3/16 inch; galvanized steel conforming to ASTM A653/A653M, minimum galvanized coating designation G90 coating class.
   1. Furnish continuous angles of profile to retain door in place with snap-on trim; mounting brackets of same metal.

C. Roller Shaft Counterbalance: Steel pipe and helical steel spring system, capable of producing torque sufficient to ensure smooth operation of curtain from any position and capable of holding position at mid-travel; with adjustable spring tension.

D. Steel pipe barrel houses springs, and supports curtain with a maximum deflection of 0.03" per foot of opening width.

E. Ball bearings at rotating support points.

F. Spring adjusting wheel accessible.

G. Hood Enclosure and Fascia: Round shape, minimum 24 gauge galvanized steel; internally reinforced to maintain rigidity and shape.

H. Hardware:
   1. Handle: Inside side mounted, adjustable keeper, spring activated latch bar with feature to keep in locked or retracted position; interior handle.
   2. Weatherstripping (Exterior Assemblies): Moisture and rot proof, resilient type for complete weathertight installation.
   3. Perimeter gaskets and closures to prevent spread of smoke through door assembly and to maintain required fire rating and fire label.

I. Electric Operator:
   1. Description: UL 325, side mounted and hood mounted, open drip-proof motor.
   2. Motor Enclosure: NEMA MG1 Type 1 enclosure.
   3. Motor Rating: continuous duty.
   4. Motor Voltage: 208 volt, three phase, 60 Hz.
   5. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
   6. Controller Enclosure: NEMA 250 Type 1.
   7. Door Speed: 12 inches per second.
   8. Brake: Adjustable friction clutch type, activated by motor controller.
   9. Inside motor operated. Motor operator is to include high starting torque motor, reduction gearing, solenoid brake, limit switches for upper and lower limits of door travel, emergency hand chain with electrical interlock to break motor circuit when hand chain is engaged, magnetic relay contactor, overload protection, prewiring to terminal block and 3 button operating station. Motor is to be removable for repair without affecting emergency operation. Manufacturer is to furnish wiring diagram. Field wiring is not included in this section.
   10. The motors, controls and protection devices shall be suitable for the environment in which they are located.

J. Control Station: Standard three button (Open-Stop-Close) momentary control for each operator; 24 volt circuit; surface mounted.

K. Safety Edge: Manufacturer's standard safety edge and weatherseal located at door bottom, full width, sensitized type, wired to stop upon striking object.

2.03 SHOP FINISHING

A. Curtain Slats: Steel, galvanized.

B. Steel Guides and Hood Enclosure: Shop prime and finish paint.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify opening sizes, tolerances and conditions are acceptable.

3.02 INSTALLATION

A. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.

B. Securely and rigidly brace components suspended from structure.

C. Fit and align assembly including hardware; level and plumb, to provide smooth operation.

D. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 079000 – Joint Protection.

E. Install perimeter trim and closures.

3.03 ERECTION TOLERANCES

A. Maintain dimensional tolerances and alignment with adjacent Work.

B. Maximum Variation From Plumb: 1/16 inch.

C. Maximum Variation From Level: 1/16 inch.

D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 ft. straight edge.

3.04 ADJUSTING

A. Adjust door, hardware and operating assemblies for smooth and noiseless operation.

B. Test smoke activated assemblies for proper activation.

3.05 CLEANING

A. Clean door and components.

B. Remove labels and visible markings.

END OF SECTION

SECTION 087100

DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Hardware for metal doors, thresholds, weatherstripping, seals, and door gaskets.

B. Related Requirements:
   1. Section 081110 – Metal Doors and Frames

1.02 PERFORMANCE REQUIREMENTS

A. Fire Rated Openings: Provide door hardware listed by UL or Warnock Hersey, or other testing laboratory approved by applicable authorities.
   1. Hardware: Tested in accordance with NFPA 252.

1.03 SUBMITTALS

A. Shop Drawings: Indicate locations and mounting heights of each type of hardware.

B. Schedule: Submit a complete schedule of all hardware to be supplied.

C. Product Data: Submit product data for each hardware item listed in the hardware schedule.

1.04 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Submit data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with the following requirements:
   1. ANSI A156 series.
   2. NFPA 80 - Fire Doors and Windows.
   3. NFPA 101 - Life Safety Code.

B. Furnish hardware marked and listed in BHMA Directory of Certified Products.

C. Coordination: Coordinate work of this section with other directly affected sections requiring integral reinforcement for door hardware.

D. Supplier: Company specializing in supplying commercial door hardware with minimum three years experience and approved by primary hardware manufacturers.

E. Door hardware shall be fully compatible with the Owner's standard door access control system.

1.06 WARRANTY

A. Furnish five year manufacturer warranty for door hardware.

1.07 MAINTENANCE SERVICE

A. Provide service and maintenance services of door closers for one year from Date of Substantial Completion.

B. Provide special wrenches and tools applicable to each different or special hardware component.

PART 2 - PRODUCTS

2.01 DOOR HARDWARE

A. Manufacturers:
1. Corbin Russwin, Inc.
2. Hager Companies.
3. SARGENT Manufacturing Company.
4. Schlage; an Allegion brand.
5. Stanley Commercial.
6. Or approved equal.

B. Hinge Manufacturers:
1. Hager Companies.
2. McKinney Products.
3. Stanley Commercial.
4. Or approved equal.

C. Lockset and Cylinder Manufacturers:
1. Best Door Hardware, Inc.
2. Corbin Russwin, Inc.
3. Hager Companies.
4. SARGENT Manufacturing Company.
5. Or approved equal.

D. Closers Manufacturers:
1. Corbin Russwin, Inc.
2. Hager Companies.
3. SARGENT Manufacturing Company.
4. Or approved equal.

2.02 COMPONENTS

A. General Hardware Requirements: Where not specifically indicated, comply with applicable ANSI A156 standard for type of hardware required. Furnish each type of hardware with accessories as required for applications indicated and for complete, finished, operational doors.
   1. Templates: Furnish templates or physical hardware items to door and frame manufacturers sufficiently in advance to avoid delay in Work.
   2. Reinforcing Units: Furnished by door and frame manufacturers; coordinated by hardware supplier or hardware manufacturer.
   3. Fasteners: Furnish as recommended by hardware manufacturer and as required to secure hardware.
      a. Finish: Match hardware item being fastened.
   4. Electrical Devices: Make provisions and coordinate requirements for electrical devices and connections for hardware.

B. Hinges: ANSI A156.1, full mortise type ball bearing complying with following general requirements unless otherwise scheduled.
   1. Widths: Sufficient to clear trim projection when door swings fully (120 degrees).
   2. Number: Furnish minimum three hinges for each door leaf, four hinges over 80” high.

C. Locksets: Furnish locksets compatible with specified cylinders. Furnish standard strikes with extended lips to protect trim from being marred by latch bolt.
   1. Bored (Cylindrical) Locksets: ANSI A156.2, Grade 1 unless otherwise indicated.
   2. Deadbolt Locks: ANSI A156.5, Grade 1 unless otherwise indicated.

D. Exit Devices: ANSI A156.3, Grade 1 concealed vertical rod type, with cross bar. Furnish standard strikes with extended lips to protect trim from being marred by latch bolt, with dust-proof floor strikes.
   1. Types: Suitable for doors requiring exit devices.
   2. Coordinators: Furnish overhead type at pairs of doors.

E. Cylinders: ANSI A156.5, Grade 1, interchangeable core type cylinders.
   1. Keying: Key to Owner’s existing keying system.
   2. Supply keys in the following minimum quantities:
      a. 3 change keys for each lock.

F. Closers: ANSI A156.4, surface mounted overhead concealed closers; full rack and pinion type with steel spring and non-freezing hydraulic fluid; closers required for fire rated doors unless otherwise indicated.
   1. Adjustability: Furnish controls for regulating closing, latching, speeds, and back checking.
   2. Arms: Type to suit individual condition; parallel-arm closers at reverse bevel doors and where doors can swing full 180 degrees.

3. Location: Mount closers on inside of exterior doors, room side of interior doors typical; mount on pull side of other doors.
4. Operating Pressure: Maximum operating pressure as follows.
    a. Interior Doors: Maximum 5 pounds.
    b. Exterior Doors: Maximum 10 pound.
    c. Fire Rated Doors: As required for fire rating, maximum 15 pounds.

G. Manual Bolts, Protection Plates, Gaskets, Thresholds, and Trim: Furnish as indicated in Schedule, with accessories as required for complete operational door installations.
1. Manual Bolts: ANSI A156.16 Grade 1 top and bottom flush bolts, with dust-proof floor strike.
2. Kickplates: ANSI A156.6, metal; height indicated in Schedule by 1 inch less than door width; stainless steel.
3. Weatherstripping: Furnish continuous weatherstripping at top and sides of exterior doors.
4. Fire Rated Gaskets: Furnish continuous fire rated gaskets at top and sides of fire rated doors.
5. Thresholds: Maximum 1/2 inch height; requirements to ensure accessibility for persons with disabilities.
6. Floor Stops: ANSI A156.1 Grade 1 dome type; furnish with accessories as required for applications indicated.

2.03 ACCESSORIES

A. Lock Trim: Furnish levers with escutcheon plate as indicated in Schedule.

B. Through Bolts: Through bolts and grommet nuts are not permitted on door faces in occupied areas unless no alternative is possible.
1. Do not use through bolts on solid wood core doors.

2.04 FINISHING

A. Finishes: ANSI A156.18; with following finishes except where otherwise indicated in Schedule shown on drawings.
1. Hinges and Pivots:
    a. BHMA 629 and 625, bright (polished) finish.
    b. BHMA 630 and 626, satin finish.
    c. BHMA 600, primed for painting.
2. Typical Exterior Exposed and High Use Interior Door Hardware:
    a. BHMA 630, satin finished stainless steel.
    b. BHMA 629, bright (polished) stainless steel.
    c. BHMA 625, bright (polished) chromium plated brass or bronze.
    d. BHMA 626, satin chromium plated brass or bronze.
    e. BHMA 605, bright brass (yellow), clear coated.
    f. BHMA 613, oil rubbed satin bronze.

3. Typical Interior Door Hardware:
    a. BHMA 625, bright (polished) chromium plated brass or bronze.
    b. BHMA 626, satin chromium plated brass or bronze.
    c. BHMA 630, satin finished stainless steel.
    d. BHMA 629, bright (polished) stainless steel.
    e. BHMA 605, bright brass (yellow), clear coated.
    f. BHMA 613, oil rubbed satin bronze.
4. Closers:
    a. BHMA 628, satin aluminum, clear anodized.
5. Thresholds:
    a. BHMA 630, satin finished stainless steel.
6. Other Items: Provide manufacturer's standard finishes to match similar hardware types on same door, and maintain acceptable finish considering anticipated use and BHMA category of finish.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify doors and frames are ready to receive work and dimensions are as indicated.

B. Verify electric power is available to power operated devices and is of correct characteristics.

3.02 INSTALLATION

A. Coordinate mounting heights with door and frame manufacturers. Use templates provided by hardware item manufacturer.

B. Mounting Heights from Finished Floor to Center Line of Hardware Item: Comply with manufacturer recommendations and applicable codes.

END OF SECTION

SECTION 099000

PAINTING AND COATING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

1. This Section includes the surface preparation, coating and painting system requirements including, but non limited to the following:
    a. Coating and painting of piping
    b. Coating and painting of structures and miscellaneous metal fabrication including, but not limited to:
        1) Piping
        2) Steel support structures
        3) Pipe supports
        4) As directed by the ENGINEER
2. The Contractor shall furnish all painting materials and equipment and shall perform all labor necessary to provide a finished and acceptable painting job for the entire project. Painting work shall be done only at such times and under such conditions to assure a durable, dust-free and workmanlike job. All painting work shall be done in 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 thickness exceed those shown in the specifications, the recommendations of the manufacturer shall govern.
3. The Contractor shall perform all required field painting of those items furnished and installed. Shop paint used on a particular surface shall be compatible with the field paint subsequently applied by the Contractor to the same surface.

B. Related Work Specified Elsewhere

1. Section 011000 – Summary of Work

1.02 DEFINITIONS

A. Refer to ASTM D16 for definitions of terms used in this Section.

B. The term "paint" as used herein means all coating systems materials, which includes pretreatments, primers, emulsions, enamels, stain, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.

C. The term "exposed" as used herein shall mean all surfaces not covered with concrete, plaster, fireproofing, or similar material.

1.03 REFERENCES

A. Comply with applicable provisions and recommendations of the following, except where otherwise shown or specified.
   1. Steel Structures Painting Council.
   2. ASTM Standards.
   3. ANSI A13.1, Scheme for the Identification of Piping Systems.
   4. OSHA 1910.144, Safety Color-Code for Marking Physical Hazards.
   5. Great Lakes - Upper Mississippi River Board of State and Provincial Public Health and Environmental Mangers (Ten States Standards), Recommended Standards for Water Works, Latest Edition.
   6. National Sanitation Foundation (NSF), Standard 61.
   7. Occupational Safety and Health Administration (OSHA) 1910.144, Safety Color-Code for Marking Physical Hazard.
   8. The Society for Protective Coatings (SSPC) Volume 2, Systems and Specifications, Surface.
   9. American Society for Testing and Materials (ASTM) D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.
   10. American Water Works Association (AWWA) C204 - Chlorinated Rubber-Alkyd Paint Systems for the Exterior of Above Ground Steel Water Piping and D102 - Painting Steel Water Storage Tanks.
   11. Requirements of Regulatory Agencies: Coatings for surfaces in contact with potable water or water being treated for potable use shall not impart any taste or odor to the water or result in any organic or inorganic content in excess of the maximum contaminant level established by applicable laws or regulations. Painting systems shall be certified for potable water contact as per NSF Standard 61.
   12. 6 NYCRR Chapter III – Air Resources Part 205 – Architectural and Industrial Maintenance Coatings

1.04 QUALITY

A. All paint products shall be supplied by the same manufacturer unless otherwise approved.

B. Applicator Qualifications
   1. Submit the name and experience record of the painting applicator. Qualified applicators shall be considered as those with not less than five (5) years' experience using the products and procedures specified herein. Include a list of utility or industrial installations painted, responsible officials, architects, or ENGINEERS concerned with the Project and the approximate contract price.
   2. Painting applicators whose submissions indicate that they have not had the experience required to perform the Work will not be approved.

C. Protection

1. Cover or otherwise protect finished Work and surfaces not being painted concurrently or not to be painted.
2. The OWNER's existing system processes and utilities shall remain in operation at all times during this Work. Employ procedures to prevent contamination of the process, or cause system shutdown due to the work of this section. Submit proposals for protection work to ENGINEER for review.
3. Do not begin painting work in any area until ENGINEER approves protection techniques proposed by CONTRACTOR.
4. Provide fire extinguishers and spot caution signs warning against smoking and open flame when working with flammable materials.

D. Environmental Requirements

1. Apply coatings only when the temperature of surfaces to be coated and the surrounding air temperatures are within the range specified by the coating manufacturers.
2. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds the manufacturer's recommendations; or to damp or wet surfaces.
3. Painting may be continued during inclement weather only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint manufacturer during application and drying periods.
4. Provide illumination and ventilation in all areas where painting operations are in progress.
5. Install piping markers and safety signs only after all painting and finish work has been completed.
6. Comply with applicable governing code requirements for air quality and material disposal regulations.
7. Provide fire extinguishers and post caution signs warning against smoking and open flame when working with flammable materials.

1.05 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Submittals.

B. Product Data:

1. Submit manufacturer data describing each product to include solids by volume, and VOC content. Include manufacturers' recommendations for mixing, thinning and curing and storage.
2. Include MPI - Approved Products Lists with proposed products highlighted.

C. Samples:
   1. Submit two paper chip samples, four by six inches in size, illustrating range of colors and finish available for each surface finishing product as scheduled.

D. Shop Drawings:
   1. Copies of CONTRACTOR's proposed protection procedure in each area of the Work.
   2. List each material and cross-reference to the specific paint and finish system and application. Identify by manufacturer's catalog number and general classification.
   3. Copies of manufacturer's complete color charts for each coating system.
   4. Submit proposed application techniques to ENGINEER. Submit proof of acceptability, of technique proposed, by the paint manufacturer selected.

E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

F. Manufacturer Instructions: Submit special surface preparation procedures and substrate conditions requiring special attention.

G. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

H. Qualifications Statements:
   1. Submit qualifications for manufacturer and applicator.
   2. Submit manufacturer's approval of applicator.

1.06 PRODUCT DELIVERY, STORAGE, HANDLING

A. Deliver materials in factory-sealed containers with manufacturer's labels intact and legible. Label shall include the following:
   1. Name and title of material.
   2. Manufacturer's stock number and date of manufacture.
   3. Manufacturer's name.
   4. Contents by volume, for major pigment and vehicle constituents.
   5. Thinning instructions where recommended.
   6. Application instructions.
   7. Color name and number.

B. Store materials in a protected area at a temperature between 45°F and 90°F. Comply with governing health and fire regulations.
   1. Handle materials in a manner which precludes the possibility of contamination, or incorrect product catalyzation.
   2. Do not open containers or mix components until necessary preparatory Work has been completed and approved by Engineer and painting Work will start immediately.

3. Maintain containers used in storage, mixing, and application of paint in a clean condition, free of foreign materials and residue.

1.07 HEALTH AND SAFETY

A. 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, but are not limited to: 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.

B. 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 10 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.

C. Provide adequate illumination while Work is in progress, including explosion-proof lights and electrical equipment.
   1. Whenever required by the ENGINEER, 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 ENGINEER.

D. Inside buildings, provide tight-fitting temporary partitions as required to protect mechanical and other equipment from abrasive blasting particles and to contain the spread of paint fumes.

E. Comply fully with the manufacturer's recommendations as to environmental conditions under which the coating and coating systems can be applied.

1.08 PAINTING NOT INCLUDED IN THE WORK OF THIS SECTION

A. The following categories of Work are not included as part of the field-applied finish Work, or are included in other sections of this Specification or in other Contracts.
   1. Shop Priming: Unless otherwise specified, shop priming of field-finished items such as structural metal, miscellaneous metal fabrications, and other fabricated components such as shop-fabricated or factory-built heating and

ventilating, and electrical equipment or accessories shall conform to applicable requirements of this Section.

B. Pre-Finished Items:
   1. Items furnished with factory finishes such as baked-on enamel, porcelain, polyvinylidene fluoride, or other similar finish.
   2. Touch up factory finished items with paint supplied by the item manufacturer. CONTRACTOR shall field paint damaged pre-finished items as directed by ENGINEER.

C. Concealed Surfaces:
   1. Nonmetallic wall or ceiling surfaces concealed from view areas and generally inaccessible areas, such as furred areas, pipe spaces, duct shafts and elevator shafts, as applicable to this Project.
   2. Paint all piping, equipment, and other such items within these areas that do not have a galvanized or other corrosion resistant finish as specified.
   3. Concrete.
   4. Plastic and fiberglass surfaces unless otherwise specified.
   5. Finished Metal Surfaces: includes anodized aluminum, stainless steel, copper and chromium plate unless otherwise indicated.
   6. Structural steel, reinforcing steel, anchors, and miscellaneous metals encased in concrete.

PART 2 - PRODUCTS

2.01 GENERAL

A. Provide finish coats that are compatible with the priming paints used. Review other Sections of these

B. Specifications in which priming paints are to be provided to ensure compatibility of the total coatings systems for the various substrates. CONTRACTOR shall be responsible for the compatibility of all shop primed and field painted items in this Contract. Furnish information on the characteristics of the finish materials proposed to use, to ensure that compatible prime coats are used. Provide barrier coats over incompatible primers or remove and re-prime as required. Notify the ENGINEER in writing of anticipated problems using the coating systems as specified with substrates primed by others.

C. Color of finish coat shall be as indicated or if not indicated, as selected by the OWNER.

D. No substitutions shall be considered which decrease the film thickness, the number of coats, the surface preparation or the generic type of coating specified. Approved manufacturers must furnish the same color selection as the manufacturers specified, including accent and custom colors in all coating systems.

E. Colors and Finishes

1. Surface treatments and finishes are shown under "Coating Systems" below. All substrates scheduled under "Coating Systems" shall be painted whether or not indicated on the Contract Drawings, or in schedules, unless an item is specified as not requiring the painting system scheduled below.

F. Color Coding - In general, all color coding of piping, pumps, and equipment shall comply with Ten State Standards Section 2.14.

G. Use representative colors when preparing samples for the review of the ENGINEER.

H. Color Pigments - Pure, non-fading, applicable types to suit the substrates and service indicated.

2.02 MATERIALS

A. The term *paint* shall mean both paints and coatings including emulsions, enamels, stains, varnishes, sealers and all other coatings, whether organic or inorganic and whether used as prime, intermediate, or finish coats.

B. 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.

C. All materials which will be in contact with potable water shall be approved by NSF, the National Sanitation Foundation. Contractor shall submit evidence of approval for all applicable materials.

D. Potable Water Exposure: NSF (National Sanitation Foundation) approved according to ANSI/NSF Standard 61.

2.03 ACCEPTABLE MANUFACTURERS

A. Sherwin-Williams Company

B. Tnemec Company, Inc.

C. Or approved equal.

D. Equivalent materials of other manufacturers may be substituted only by approval of the Engineer. Requests for substitution shall include manufacturer's literature for each product giving the name, generic type, descriptive information, solids by volume, recommended dry film thicknesses and a list of five projects where each product has been used and rendered satisfactory service. No request for substitution shall be considered that would decrease film thickness or offer a change in the generic type of coating specified.

E. Products for each specified function and system shall be of a single manufacturer.

2.04 COATING SYSTEMS

A. Carbon Steel (structural steel, miscellaneous metal, tanks, piping and equipment).
   1. Interior Steel, Non-Immersion:
      a. Applications include new structural steel, pumps, valves, piping, and equipment. Existing interior steel without coating or with coating system significantly damaged.
         1) Surface Preparation - SSPC SP6 or SSPC SP11
         2) Prime Coat – Tnemec Series 394 PerimePrime; Sherwin Williams Corothane I Mio-Aluminum
            a) Dry Film Thickness - 2.5 to 3.5 mils.
         3) Intermediate Coat – Tnemec Series V69 Hi-Build Epoxoline II; Sherwin Williams Macropoxy 646 FC
            a) Dry Film Thickness - 3.0 to 5.0 mils.
         4) Finish Coat – Tnemec Series V69 Hi-Build Epoxoline II; Sherwin Williams Macropoxy 646 FC
            a) Dry Film Thickness - 3.0 to 5.0 mils.
   2. Interior Steel, Non-Immersion: Applications include existing steel pipe with existing coating system significantly intact.
      a. Surface Preparation - SSPC SP1 and SSPC SP2
      b. Prime Coat – Spot and Full Prime Coat – Tnemec Series 394 PerimePrime;
         1) Sherwin Williams Corothane I Mio-Aluminum
            a) Dry Film Thickness – 2.5 to 3.5 mils.
      c. Finish Coat – Tnemec Series V69 Hi-Build Epoxoline II;
         1) Sherwin Williams Macropoxy 646 FC
            a) Dry Film Thickness - 3.0 to 5.0 mils.

2.05 MATERIAL PREPARATION

A. Mix and thin materials according to manufacturer's latest printed instructions.

B. Do not use materials beyond manufacturer's recommended shelf life.

C. Do not use mixed materials beyond manufacturer's recommended pot life.

PART 3 - EXECUTION

3.01 GENERAL

A. Moving parts of operating units, mechanical and electrical parts, such as valve operators, and motor shafts do not require finish painting, unless otherwise specified.

B. Do not paint over any code-required labels, such as UL and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.

C. Remove all paint, coating or splatter inadvertently placed on these surfaces.

D. Touch up factory finished items with paint supplied by the item manufacturer. CONTRACTOR shall field paint damaged pre-finished items as directed by ENGINEER.

3.02 PRE-WORK INSPECTION

A. Examine surfaces to be coated and report conditions that would adversely affect appearance or performance of coating systems and which cannot be put into an acceptable condition by preparatory work specified in Paragraph 3.2.

B. Do not proceed with surface preparation and application until surface is acceptable or authorization to proceed is given by Engineer.

3.03 PREPARATION

A. Surfaces
   1. Dislodge dirt, rust, plaster nibs, mortar spatter and other dry material by scraping or brushing. Remove dust and loose material by brushing, sweeping, vacuuming or blowing with high-pressure air.
   2. Remove oil, wax, and grease by scraping off heavy deposits and cleaning with mineral spirits or a hot trisodium phosphate solution followed by a water rinse.
   3. Verify that surfaces to be coated are dry, clean and free of dust, dirt, oil, wax, grease or other contaminants.
   4. Hardware accessories, machined surfaces, plates, lighting fixtures and similar items in place prior to cleansing and painting, and not intended to be painted, shall be protected or removed during painting operations and repositioned upon completion of painting operations.
   5. All surface preparations shall be in strict accordance with the recommendations of the paint manufacturer.
   6. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint manufacturer.
   7. Do not apply exterior coatings during rain or snow, when relative humidity is outside humidity ranges, or when moisture content of surfaces exceeds those required by paint manufacturer.
   8. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors and 50 degrees F for exteriors, unless otherwise indicated by manufacturer instructions.

B. Materials
   1. Mix and prepare painting materials in strict accordance with the manufacturer's directions.
   2. Do not mix together coating materials produced by different manufacturers, unless otherwise permitted by the manufacturer's instructions.

3. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing, and application of paint in a clean condition, free of foreign materials and residue.
4. Stir all materials before application to produce a mixture of uniform density, and as required during the application of the materials as defined by the manufacturer.

3.04 APPLICATION

A. Apply materials at specified film thickness by method recommended by manufacturer.

B. Allow each coat to dry thoroughly before recoating. Follow manufacturer's recommended recoat time.

C. Cut edges clean and sharp where work joins other materials or colors.

D. Make finish coats smooth, uniform in color, and free of brush marks, laps runs, dry spray, overspray, and skipped or missed areas.

E. Shop Painting: All fabricated steel work and equipment shall receive at the factory at least one (1) shop coat of prime paint as required by these specifications. Surface preparation prior to shop painting shall be as specified. All shop painted items shall be properly packaged and stored until they are incorporated in the work. Flange faces in piping, valves, and fittings shall be completely prime coated prior to installation. Any painted surfaces that are damaged during handling, transportation, storage or installation shall be cleaned, scraped, and patched before field painting begins so that the work shall be equal to the original painting received at the shop. Equipment or steel work that is to be assembled on the site shall likewise receive a minimum of one shop coat of paint at the factory. The paints and surface preparation used for shop coating shall be identified on shop drawings submitted to the Engineer. Where the exact identity of the shop primer cannot be determined, or where primer differs from that specified, Contractor shall perform a near-white blast (SSPC-SP10) followed by specified paint system.

3.05 FIELD QUALITY CONTROL

A. CONTRACTOR shall provide all equipment necessary to maintain the proper humidity level in the Work area in accordance with manufacturers' representatives. CONTRACTOR shall submit to ENGINEER a plan to properly address any and all humidity problems prior to the start of Work in accordance with Manufacturer's recommendations. Plan shall be for ENGINEER's information and not submitted for approval.

B. After completion of each coat of paint, CONTRACTOR shall notify ENGINEER. After inspection, checking of film thickness and approval by ENGINEER, proceed with the succeeding coat. CONTRACTOR shall supply a Gardner dry-film thickness gage and check the film thickness in the presence and at locations directed by the ENGINEER. Additional coats shall be applied, if required, to produce the specified film thickness.

C. Protection
   1. Protect work of other trades, whether to be painted or not, against damage by the painting and finishing work. Leave all such work undamaged. Correct all damages by cleaning, repairing or replacing, and repainting, as acceptable to the ENGINEER.
   2. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove all temporary protective wrappings provided for protection after completion of painting operations.

3.06 CLEANING

A. During the progress of the Work, remove from the Site all discarded paint materials, rubbish, cans and rags at the end of each workday.

B. Upon completion of painting work, clean window glass and all other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

C. At the completion of work of other trades, touchup and restore all damaged or defaced painted surfaces as determined by ENGINEER.

END OF SECTION

SECTION 119000

LIFTING EQUIPMENT - GANTRY CRANE

PART 1 - GENERAL

1.01 INTENT OF SECTION

A. This section covers supply, delivery, supervision of installation and commissioning of the portable gantry crane and related accessories.

1.02 RELATED SECTIONS

A. Division 1 - General Requirements

B. Division 13 – Control and Instrumentation

C. Division 15 – Mechanical

D. Division 16 – Mechanical

1.03 OPERATING CONDITIONS

A. The following site operating and water quality conditions must be assumed for all design calculations:
   1. 40 degrees C maximum and 5 degrees C minimum ambient air temperature
   2. 95% maximum relative humidity (non condensing)
   3. fully enclosed facility

1.04 REFERENCE STANDARDS

A. Performance Standard for Electric Chain Hoists – ANSI HST-1-1999.

B. Specifications for Overhead and Gantry Cranes – ANSI B30.17-2003.

C. Construction and Test of Electric Cranes and Hoists – CSA C22.2 No. 33M1984.

D. Canadian Electrical Code – CSA 22.1.

E. Certification of Companies for Fusion Welding of Aluminum – CSA W47.2-M1987.

F. Ontario Hydro Electrical Safety Code.

G. Ontario Occupational Health and Safety Act and Regulations.

1.05 SHOP DRAWINGS

A. Submit the Shop Drawings in accordance with Section 013300 – Shop Drawing Procedures

B. The shop drawing submission shall include, but not limited to, the following:
   1. Submission details covered in Section 013300 – Shop Drawing Procedures.
   2. Provide sufficient detail to show the general construction pertinent to the proper review of the equipment. Description of the materials of construction of the major components including:
      a. Details of vertical, diagonal and horizontal members.
      b. Details of electrical motors where specified. Supply technical details from the manufacturer.
   3. General assembly drawings of beam trolleys, hoists and other major components.
   4. A precise list of all electrical requirements for the equipment including all controls, monitoring equipment and instrumentation shall be given including all power characteristics and materials of construction.
   5. The Supplier shall indicate a list of spare parts which he/she would recommend be purchased and individual prices for each item.
   6. All ancillary equipment to be provided by the Supplier shall be listed.
   7. Special accessories or tools for the adjustment or removal of parts required for any piece of equipment shall be listed and furnished as part of the supply.

1.06 MAINTENANCE DATA

A. Refer to section 017000 – Execution and Closeout Requirements

1.07 MEASURE AND PAYMENT

A. The Work performed in this section is included in the Lump Sum Tender Price.

PART 2 - PRODUCTS

2.01 GENERAL

A. Refer to the Contract Drawings for further details.

B. All lifting systems shall be capable of overcoming the initial dislodging force, overcoming friction including pump and lifting chain weight (the sum of all of these weights is referred to as the minimum weight).

C. Portable gantry crane and hoist shall be manufactured from materials that are compatible and shall not corrode, and will operate safely, in all weather conditions.

D. Gantry Crane supplier shall have a minimum 10 years experience in the manufacture, testing and supply of specified system.

E. All components must be of North American Origin.

F. Gantry crane must be welded by Welders certified to CSA 47.2 Fusion welding of aluminum.

G. Gantry crane must include an engineer sealed drawing.

H. Gantry crane must be certified to be rolled under full load.

I. Gantry must be able to be assembled manually, using no rigging, overhead cranes etc.

2.02 GANTRY CRANE

A. Provide one (1) lightweight, portable and adjustable gantry crane to the following specifications:
   1. Lightweight, corrosion-resistant, all aluminum alloy construction, with anodized powder coated finish.
   2. Minimum 2000 Kg (4,400 lb.) lifting capacity.
   3. Minimum 1.5m (5 ft) clear span between supporting legs, adjustable to 2.5 m (8 ft) with a minimum clearance to the lifting ring of 1.7m (5.5 ft.).
   4. Adjustable beam span and support leg height.
   5. Extruded hollow aluminum alloy box beam..
   6. Locking beam trolley with friction brake and lifting ring for chain hoist
   7. Total assembled weight shall be less than 80 Kg (175 lb.).
   8. The gantry crane height shall be supplied with locking casters to eliminate spin and roll in separate functions.
   9. Fittings
      a. Provide all fittings. Include all structural aluminum hangers, braces and all connection hardware.
      b. Provide adequately sized fabricated fittings for the indicated loads and factors of safety.
   10. Bolts, Nuts and Clamps
      a. Provide all bolts and nuts, grade L-9.
   11. The gantry crane shall be supplied complete with a beam trolley, as supplied by EME Model 4400M.

2.03 CHAIN HOIST

A. Provide the following chain hoists, which must be compatible with the specified Gantry Crane.
   1. 1 – 2000 kg capacity manual chain hoist with 10m galvanized lifting chain and chain container.
   2. electric hoist to be 115V and supplied with 4m of power cord.

2.04 WARRANTY

A. The Manufacturer shall provide a ten (10) year warranty on all components against defects in workmanship and materials from the date of start-up. All components shall be fully tested prior to shipping.

2.05 ACCEPTABLE MANUFACTURERS

A. Equipment must be supplied from acceptable Manufacturer:
   1. EME – Easily Moved Equipment, Inc. – to order equipment contact state or provincial representative – see EME website: www.easilymovedequipment.com for name of state or provincial representative) (888) 679-5283 fax: (905) 991-0444.

PART 3 - EXECUTION – (NOT USED)

END OF SECTION

SECTION 230700

HVAC INSULATION

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. HVAC ductwork insulation, jackets, and accessories.

1.02 REFERENCES

A. ASTM International:
   1. ASTM C450 - Standard Practice for Fabrication of Thermal Insulating Fitting Covers for NPS Piping, and Vessel Lagging.
   2. ASTM C533 - Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation.
   3. ASTM C534 - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
   4. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
   5. ASTM C921 - Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.
   6. ASTM C1071 - Standard Specification for Thermal and Acoustical Insulation (Glass Fiber, Duct Lining Material).
   7. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.
   8. ASTM E162 - Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source.

B. Sheet Metal and Air Conditioning Contractors:
   1. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.

1.03 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Submittal procedures.

B. Product Data: Submit product description, thermal characteristics and list of materials and thickness for each service, and location.

C. Manufacturer's Installation Instructions: Submit manufacturers published literature indicating proper installation procedures.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.04 QUALITY ASSURANCE

A. Duct insulation, Coverings, and Linings: Maximum 25/50 flame spread/smoke developed index, when tested in accordance with ASTM E84, using specimen procedures and mounting procedures of ASTM E 2231.

B. Perform Work in accordance with New York State Standards.

C. Maintain one copy of each document on site.

1.05 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three (3) years experience.

1.06 PRE-INSTALLATION MEETINGS

A. Section 013113 – Project Coordination: Pre-installation meeting.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Section 016500 – Transportation and Handling of Materials and Equipment and Section 016600 – Storage of Material.

B. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.

C. Protect insulation from weather and construction traffic, dirt, water, chemical, and damage, by storing in original wrapping.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Section 016500 – Transportation and Handling of Materials and Equipment and Section 016600 – Storage of Material.

B. Install insulation only when ambient temperature and humidity conditions are within range recommended by manufacturer.

C. Maintain temperature before, during, and after installation for minimum period of 24 hours.

1.09 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.10 WARRANTY

A. Section 017000 - Execution and Closeout Requirements: Product warranties and product bonds.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Glass Fiber and Mineral Fiber Insulation
   1. Manufacturers:
      a. CertainTeed LLC; Saint-Gobain North America.
      b. Johns Manville; a Berkshire Hathaway company.
      c. Knauf Insulation.
      d. Manson Insulation Inc.
      e. Owens Corning.

2.02 DUCTWORK INSULATION

A. TYPE D-1: ASTM C1290, Type III, flexible glass fiber, commercial grade with factory applied reinforced aluminum foil jacket meeting ASTM C1136, Type II.
   1. Thermal Conductivity: 0.25 at 75 degrees F.
   2. Maximum Operating Temperature: 250 degrees F.
   3. Insulation shall include vapor barrier.

2.03 DUCTWORK INSULATION ACCESSORIES

A. Vapor Retarder Tape:
   1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.

B. Vapor Retarder Lap Adhesive: Compatible with insulation.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify ductwork has been tested before applying insulation materials.

B. Verify surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION - DUCTWORK SYSTEMS

A. Duct dimensions indicated on Drawings are finished inside dimensions.

B. Insulated ductwork conveying air below ambient temperature:
   1. Provide insulation with vapor retarder jackets.
   2. Finish with tape and vapor retarder jacket.
   3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
   4. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

C. Insulated ductwork conveying air above ambient temperature:
   1. Provide with or without standard vapor retarder jacket.
   2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.

D. External Glass Fiber Duct Insulation:
   1. Secure insulation with vapor retarder with wires and seal jacket joints with vapor retarder adhesive or tape to match jacket.
   2. Secure insulation without vapor retarder with staples, tape, or wires.
   3. Install without sag on underside of ductwork. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift ductwork off trapeze hangers and insert spacers.
   4. Seal vapor retarder penetrations by mechanical fasteners with vapor retarder adhesive.
   5. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

3.03 SCHEDULES

A. Ductwork Insulation Schedule:
   1. Outside Air Intake:
      a. Type: D-1.
      b. Thickness: 1.5 inch.

END OF SECTION

SECTION 230900

INSTRUMENTATION AND CONTROL FOR HVAC

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Electronic Temperature Control.
   2. Thermostats.
   3. Electric damper actuators.

B. Related Requirements:
   1. Section 230993 - Sequence of Operations for HVAC Controls: Sequences of operation implemented using products specified in this Section.
   2. Section 260503 - Equipment Wiring Connections: Execution requirements for electric connections specified by this Section.

1.02 REFERENCE STANDARDS

A. National Electrical Manufacturers Association:
   1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
   2. NEMA DC 3 - Residential Controls - Electrical Wall-Mounted Room Thermostats.

B. National Fire Protection Association:
   1. NFPA 72 - National Fire Alarm and Signaling Code.
   2. NFPA 90A - Installation of Air-Conditioning and Ventilating Systems.

1.03 COORDINATION

A. Section 013113 – Project Coordination: Requirements for coordination.

1.04 PREINSTALLATION MEETINGS

A. Section 013113 – Project Coordination: Requirements for preinstallation meeting.

1.05 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Requirements for submittals.

B. Product Data:
   1. Submit description and engineering data for each control system component, including sizing as applicable.

C. Shop Drawings:
   1. Indicate operating data, system drawings, wiring diagrams, and written, detailed operational description of sequences.
   2. Coordinate submittals with information requested in Section 230993 - Sequence of Operations for HVAC Controls.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Manufacturer's Instructions: Submit installation requirements for each control component.

1.06 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for closeout procedures.

B. Project Record Documents: Record actual locations of control components, including panels, thermostats, and sensors.

1.07 MAINTENANCE MATERIAL SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance materials.

1.08 QUALITY ASSURANCE

A. Perform Work according to New York State standard.

1.09 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' experience.

B. Installer: Company specializing in performing Work of this Section with minimum three years' experience.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Section 016500 – Transportation and Handling of Materials and Equipment: Requirements for transporting and handling, products.

B. Section 016600 – Storage of Material: Requirements for storing and protecting products.

C. Inspection: Accept controls on-Site in original factory packaging and inspect for damage.

D. Store materials according to manufacturer's instructions.

1.11 EXISTING CONDITIONS

A. Field Measurements:
   1. Verify field measurements prior to fabrication.
   2. Indicate field measurements on Shop Drawings.

1.12 WARRANTY

A. Section 017000 - Execution and Closeout Requirements: Requirements for warranties.

PART 2 - PRODUCTS

2.01 ELECTRONIC TEMPERATURE CONTROL (INFRARED HEATERS)

A. Manufacturers:
   1. Johnson Controls A421 Series or approved equal.

B. Electronic Temperature Control with Remote Sensor:
   1. Voltage: 24 V.
   2. Service: Heating only.
   3. Covers: Non-locking with liquid crystal display, menu button, set point adjustment and set point indication.
   4. Temperature Sensor: Stainless steel sensor bulb, pipe mounting hardware, 24 volt, adjustable cable length.

2.02 THERMOSTATS (EXHAUST FAN)

A. Manufacturers:
   1. Furnish materials according to New York State standards.

B. Line Voltage Thermostats:
   1. Selector Switch:
      a. Integral.
      b. Single-Pole.
   2. Dead Band: Maximum 2 degrees F.

2.03 CONTROL AIR DAMPERS

A. Manufacturers:
   1. Air Balance; a division of MESTEK, Inc.
   2. Greenheck Fan Corporation.
   3. Johnson Controls, Inc.
   4. Nailor Industries Inc.
   5. Ruskin Company.

B. Frames:
   1. Materials: 6063T-5 Aluminum welded or riveted with corner reinforcement.
   2. Minimum Thickness: .125 inches.

C. Blades:
   1. Material: 6063T-5 Extruded aluminum.

   2. Blade Size:
      a. Width: 4 inches
      b. Length: 30 inches.
      c. Minimum Thickness: .081 inches
   3. Attach to minimum 1/2-inch shafts with set screws.

D. Seals:
   1. Blades:
      a. Material: Extruded vinyl
      b. Mechanically attached.
   2. Jambs: Stainless-steel jam seals.

E. Bearings:
   1. Synthetic sleeve type
   2. Linkage: Side linkage concealed in frame.

F. Outside Air Damper Leakage: Maximum rate of 9 cfm per sq. ft.at 1 inch wg pressure differential.

G. Temperature Limits: Minus 20 to 180 degrees F.

2.04 ELECTRIC DAMPER ACTUATORS

A. Manufacturers:
   1. Belimo Aircontrols (USA), Inc.
   2. Greenheck Fan Corporation.
   3. Honeywell International Inc.
   4. Johnson Controls, Inc.
   5. Ruskin Company.
   6. Siemens Industry, Inc., Building Technologies Division.

B. Operation: Two position

C. Enclosure: Comply with NEMA 250, Type 1.

D. Mounting: Direct.

E. Stroke:
   1. Full Stroke: <75 seconds, end to end.
   2. Spring Return: <25 seconds, return to normal.

F. Electrical Characteristics:

G. Nominal Power: 120 V ac.

H. Torque: 18 in. lbs.

I. Duty Cycle: Rated for 65,000 cycles.

J. Accessories:
1. Damper linkage.
2. End switch.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.

B. Verify locations of thermostats and other exposed control sensors with Drawings before installation.

C. Verify that building systems to be controlled are ready to operate.

3.02 INSTALLATION

A. Thermostats and Space Temperature Sensors:
1. Install after locations have been coordinated with other work.
2. Install 48 inches above floor.
3. Align with light switches.

B. Install conduit and electrical wiring as specified in Section 260503 - Equipment Wiring Connections.

3.03 FIELD QUALITY CONTROL

A. Section 017000 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.

B. After completion of installation, test and adjust control equipment.

C. Equipment Acceptance:
1. Adjust, repair, modify, or replace components failing to perform as specified, and rerun tests.
2. Make final adjustments to equipment under direction of manufacturer's representative.

D. Furnish Installation Certificate from equipment manufacturer's representative attesting that equipment has been properly installed and is ready for startup and testing.

3.04 DEMONSTRATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for demonstration and training.

B. Demonstrate complete operation of systems, including sequence of operation, equipment startup, shutdown, routine maintenance, and emergency repair procedures, to Owner's personnel.

3.05 MAINTENANCE

A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance service.

B. Provide service and maintenance of control system for one year from date of Substantial Completion.

C. Furnish complete service of controls systems, including callbacks.

D. Provide systematic examination, adjustment, and lubrication of unit and controls checkout and adjustments.

E. Repair or replace parts according to manufacturer's operating and maintenance data, using parts produced by manufacturer of original equipment.

F. Perform Work without removing units from service during normal building occupied hours.

G. Perform Work using personnel under supervision of manufacturer or original installer.

END OF SECTION

SECTION 230993

SEQUENCE OF OPERATIONS FOR HVAC CONTROLS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes sequence of operation for:
   1. Exhaust fans.
   2. Infrared heaters.

B. Related Sections:
   1. Section 230900 - Instrumentation and Control for HVAC: For equipment, devices, and system components to implement sequences of operation.

1.02 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Submittal procedures.

B. Shop Drawings: Indicate mechanical system controlled and control system components.
   1. Label with settings, adjustable range of control and limits. Submit written description of control sequence.
   2. Coordinate submittals with information requested in Section 230900 – Instrumentation and Control for HVAC.

1.03 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance materials.

PART 2 - PRODUCTS

2.01 Not Used.

PART 3 - EXECUTION

3.01 EXHAUST FANS

A. On room temperature above 75 degrees F, open intake and exhaust dampers and start exhaust fans.

B. On room temperatures above 90 degrees F, signal alarm.

3.02 INFRARED HEATERS

A. Single temperature electric room thermostat per heater maintains constant pipe temperature of 55 degrees F by cycling heater on and off.

B. On pipe temperatures below 45 degrees F, signal alarm.

END OF SECTION

SECTION 231123

FACILITY NATURAL-GAS PIPING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Natural gas piping above grade.
   2. Unions and flanges.
   3. Valves.
   4. Pipe hangers and supports.

B. Related Sections:
   1. Section 099000 - Painting and Coating: Product requirements for painting for placement by this section.

1.02 REFERENCES

A. American National Standards Institute:
   1. ANSI Z21.15 - Manually Operated Gas Valves for Appliances, Appliance Connector Valves and Hose End Valves.

B. American Society of Mechanical Engineers:
   1. ASME B16.3 - Malleable Iron Threaded Fittings.
   2. ASME B16.33 - Manually Operated Metallic Gas Valves for Use in Gas Piping Systems Up to 125 psig (sizes 1/2 - 2).

C. ASTM International:
   1. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
   2. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers.

D. American Welding Society:
   1. AWS D1.1 - Structural Welding Code - Steel.

E. Manufacturers Standardization Society of the Valve and Fittings Industry:
   1. MSS SP 58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
   2. MSS SP 69 - Pipe Hangers and Supports - Selection and Application.
   3. MSS SP 78 - Cast Iron Plug Valves, Flanged and Threaded Ends.
   4. MSS SP 89 - Pipe Hangers and Supports - Fabrication and Installation Practices.
   5. MSS SP 110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

F. National Fire Protection Association:
   1. NFPA 54 - National Fuel Gas Code.

1.03 SYSTEM DESCRIPTION

A. Where more than one piping system material is specified, provide compatible system components and joints. Use non-conducting dielectric connections when joining dissimilar metals in systems.

B. Provide unions, or couplings at locations requiring servicing. Use unions, or couplings downstream of valves and at equipment connections. Do not use direct welded or threaded connections to valves, equipment.

C. Provide pipe hangers and supports in accordance with MSS SP 58, MSS SP 69, and] MSS SP 89.

D. Use ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

1.04 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Submittal procedures.

B. Product Data:
   1. Piping: Submit data on pipe materials, fittings, and accessories. Submit manufacturers catalog information.
   2. Valves: Submit manufacturers catalog information with valve data and ratings for each service.
   3. Hangers and Supports: Submit manufacturers catalog information including load capacity.

C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.05 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.

B. Operation and Maintenance Data: Submit for valves installation instructions.

1.06 QUALITY ASSURANCE

A. Perform natural gas Work in accordance with NFPA 54.

B. Furnish shutoff valves complying with ASME B16.33.

C. Maintain one (1) copy of each document on site.

1.07 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three (3) years' experience.

B. Installer: Company specializing in performing Work of this section with minimum three (3) years' documented experience.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Section 016500 – Transportation and Handling of Materials and Section 016600 – Storage of Materials.

B. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

C. Protect piping and fittings from soil and debris with temporary end caps and closures. Maintain in place until installation. Furnish temporary protective coating on cast iron and steel valves.

1.09 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.10 COORDINATION

A. Section 013113 – Project Coordination: Requirements for coordination.

1.11 WARRANTY

A. Section 017000 - Execution and Closeout Requirements: Product warranties and product bonds.

PART 2 - PRODUCTS

2.01 NATURAL GAS PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53/A53M Schedule 40 black.
   1. Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M forged steel welding type.
   2. Joints: Threaded for pipe 2 inch and smaller; welded for pipe 2-1/2 inches and larger.

B. Corrugated Stainless Steel Tubing: ANSI LC 1.

2.02 UNIONS AND FLANGES

A. Unions for Pipe 2 inches and Smaller:
   1. Ferrous Piping: Class 150, malleable iron, threaded.

B. Flanges for Pipe 2-1/2 inches and Larger:
   1. Ferrous Piping: Class 150, forged steel, slip-on flanges.
   2. Gaskets: 1/16 inch thick preformed neoprene gaskets.

2.03 BALL VALVES

A. Furnish materials in accordance with New York State standards.

B. 1/4 inch to 1 inch: MSS SP 110, Class 125, two piece, threaded ends, bronze body, chrome plated bronze ball, reinforced teflon seats, blow-out proof stem, lever handle, UL 842 listed for flammable liquids and LPG, full port.

C. 1-1/4 inch to 3 inch: MSS SP 110, Class 125, two piece, threaded ends, bronze body, chrome plated bronze ball, reinforced teflon seats, blow-out proof stem, lever handle, UL 842 listed for flammable liquids and LPG, conventional port.

2.04 PIPE HANGERS AND SUPPORTS

A. Furnish materials in accordance with New York State standards.

B. Conform to NFPA 54MSS SP 58, MSS SP 69, and MSS SP 89.

C. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: malleable iron adjustable swivel, split ring.

D. Hangers for Pipe Sizes 2 inches and Larger: Carbon steel, adjustable, clevis.

E. Wall Support for Pipe 3 inches and Smaller: Cast iron hook.

F. Vertical Support: Steel riser clamp.

PART 3 - EXECUTION

3.01 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with unions.

3.02 INSTALLATION - INSERTS

A. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.

3.03 INSTALLATION - PIPE HANGERS AND SUPPORTS

A. Install hangers and supports in accordance with MSS SP89.

B. Support horizontal piping hangers as scheduled.

C. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.

D. Place hangers within 12 inches of each horizontal elbow.

E. Install hangers to allow 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.

F. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.

G. Provide sheet lead packing between hanger or support and piping.

H. Prime coat exposed steel hangers and supports in accordance with Section 099000. Finish paint exposed steel hangers and supports in accordance with Section 099000.

I. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

3.04 INSTALLATION - ABOVE GROUND PIPING SYSTEMS

A. Install natural gas piping in accordance with NFPA 54.

B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

C. Route piping in orderly manner and maintain gradient.

D. Install piping to conserve building space and not interfere with use of space.

E. Size and install gas piping to provide sufficient gas to supply maximum appliance demand at pressure higher than appliance minimum inlet pressure.

F. Group piping whenever practical at common elevations.

G. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

H. Install firestopping at fire rated construction perimeters and openings containing penetrating sleeves and piping.

I. Where pipe support members are welded to structural building framing, scrape, brush clean, weld, and apply one coat of zinc rich primer.

J. Provide support for utility meters in accordance with requirements of utility company.

K. Prepare pipe, fittings, supports, and accessories not pre-finished, ready for finish painting. Refer to Section 099000.

L. Install valves with stems upright or horizontal, not inverted.

M. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

N. Provide new gas service complete with gas meter and regulators. Gas service distribution piping to have initial minimum pressure of 7 inch wg.

3.05 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements and 017000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Where gas appliance will be damaged by test pressure, disconnect appliance and cap piping during pressure test. Reconnect appliance after pressure test and leak test connection.

C. Where gas appliance is designed for operating pressures equal to or greater than piping test pressure, provide gas valve to isolate appliance or equipment from gas test pressure.

D. Pressure test natural gas piping in accordance with NFPA 54.

E. When pressure tests do not meet specified requirements, remove defective work, replace and retest.

F. Immediately after gas is applied to a new system, or a system has been restored after gas service interruption, check pipe for leakage.
   1. Where leakage is detected, shut off gas supply until necessary repairs are complete.

G. Do not place appliances in service until leak testing and repairs are complete.

3.06 SCHEDULES

A. Valve Service:
   1. Natural-Gas Piping: Shutoff.

B. Pipe Hanger Spacing:

C. Steel Pipe Hanger Spacing:
   1. Pipe Size 1/2 Inch:
      a. Maximum Hanger Spacing: 6 feet.
      b. Hanger Rod Diameter: 3/8 inch.
   2. Pipe Size 3/4 Inch:
      a. Maximum Hanger Spacing: 7 feet.
      b. Hanger Rod Diameter: 3/8 inch.
   3. Pipe Size 1 Inch:
      a. Maximum Hanger Spacing: 7 feet.
      b. Hanger Rod Diameter: 3/8 inch.
   4. Pipe Size 1-1/4 Inches:
      a. Maximum Hanger Spacing: 7 feet.
      b. Hanger Rod Diameter: 3/8 inch.
   5. Pipe Size 1-1/2 Inches:
      a. Maximum Hanger Spacing: 9 feet.
      b. Hanger Rod Diameter: 3/8 inch.
   6. Pipe Size 2 Inches:
      a. Maximum Hanger Spacing: 10 feet.
      b. Hanger Rod Diameter: 3/8 inch.

END OF SECTION

SECTION 233100

HVAC DUCTS AND CASINGS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Duct materials.
   2. Ductwork fabrication.

1.02 REFERENCE STANDARDS

A. ASTM International:
   1. ASTM A36 - Standard Specification for Carbon Structural Steel.
   2. ASTM A36M - Standard Specification for Carbon Structural Steel.
   3. ASTM A90 - Standard Test Method for Weight Mass of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
   4. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   5. ASTM A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   6. ASTM A1008 - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.

B. International Code Council:
   1. International Mechanical Code (IMC).

C. Sheet Metal and Air Conditioning Contractors' National Association:
   1. SMACNA 016 - HVAC Air Duct Leakage Test Manual.
   2. SMACNA 1966 - HVAC Duct Construction Standards - Metal and Flexible.

D. UL:
   1. UL 181 - Factory-Made Air Ducts and Air Connectors.
   2. UL 181A - Closure Systems for Use With Rigid Air Ducts.

1.03 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Requirements for submittals.

B. Product Data: Submit manufacturer information for duct materials.

C. Shop Drawings:
    a. Fabrication, assembly, and installation details, including plans, elevations, sections, details of components, and attachments to other Work.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Welder Certificates: Certify welders and welding procedures employed on Work, verifying AWS qualification within previous 12 months.

F. Qualifications Statements:
    1. Submit qualifications for manufacturer, installer, and licensed professional.

1.04 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.

1.05 QUALITY ASSURANCE

A. Perform Work according to SMACNA 1884 and 1966.

B. Construct ductwork to NFPA 90Astandard.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three (3) years experience.

B. Installer: Company specializing in performing Work of this Section with minimum three (3) years' experience.

C. Welders: AWS qualified within previous 12 months for employed weld types.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Section 016500 – Transportation and Handling of Materials and Equipment and Section 016600 – Storage of Material.

B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Store materials according to manufacturer instructions.

D. Protection:
    1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
    2. Provide additional protection according to manufacturer instructions.

1.08 AMBIENT CONDITIONS

A. Section 015200 - Temporary Construction Facilities: Requirements for ambient condition control facilities for product storage and installation.

B. Minimum Conditions: Do not install duct sealant when temperatures are less than those recommended by sealant manufacturer.

C. Subsequent Conditions: Maintain temperatures during and after installation of duct sealant.

1.09 EXISTING CONDITIONS

A. Field Measurements:
   1. Verify field measurements prior to fabrication.

1.10 WARRANTY

A. Section 017000 - Execution and Closeout Requirements: Requirements for warranties.

PART 2 - PRODUCTS

2.01 DUCTS

A. Performance and Design Criteria:
   1. Variation of duct configuration or sizes other than those of equivalent or lower loss coefficient is not permitted except by written permission of Engineer.
   2. Size round ducts installed in place of rectangular ducts according to ASHRAE Handbook - Fundamentals.

B. Materials:

C. Galvanized-Steel Ducts:
   1. Material: ASTM A653galvanized-steel sheet.
   2. Quality: Lock forming.
   3. Finish: G60 zinc coating according to ASTM A90.

D. Steel Ducts: Comply with ASTM A1008.

E. Fasteners: Rivets, bolts, or sheet metal screws.

F. Hanger Rod:
1. Material: Galvanized steel.
2. Comply with ASTM A36.
3. Type: Threaded continuously.

2.02 FABRICATION

A. Rectangular Ducts:
1. According to SMACNA 1966 and as indicated on Drawings.
2. Provide duct material, gages, reinforcing, and sealing for indicated operating pressures.

B. Tees, Bends, and Elbows:
1. Minimum Radius:
a. 1-1/2 times centerline duct width.
b. If not possible or if rectangular elbows are used, provide air foil turning vanes.

C. Divergence:
1. Increase duct sizes gradually, not exceeding 15 degrees of divergence wherever possible.
2. Upstream of Equipment: Maximum 30 degrees.
3. Downstream of Equipment: Maximum 45 degrees.

D. Sealing:
1. Seal joints between duct sections and duct seams with welds, gaskets, mastic adhesives, mastic plus embedded fabric systems, or tape.
2. Sealants, Mastics, and Tapes: Comply with UL 181A and provide products bearing appropriate UL 181A markings.

2.03 ACCESSORIES

A. Hangers and Supports:
1. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.
2. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.
3. Strap and Rod Sizes:
a. Comply with SMACNA 1966.
4. Trapeze and Riser Supports:
a. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.

B. Verify sizes of equipment connections before fabricating transitions.

3.02 PREPARATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.

B. Obtain manufacturer's inspection and acceptance of fabrication and installation at beginning of installation.

C. Install temporary closures of metal or taped PE on open ductwork to prevent construction dust from entering ductwork system.

3.03 INSTALLATION

A. Install and seal ducts according to SMACNA 1966.

B. Hanger and Supports:
   1. Fabricate and support ducts according to SMACNA 1884 and 1966.
   2. Threaded Rods: Provide double nuts and lock washers.
   3. Building Attachments:
      a. Provide concrete inserts or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
      b. Powder-Actuated Concrete Fasteners:
         1) Use only for slabs more than 4 inches thick.
         2) Install after concrete is placed and completely cured.
   4. Hanger Spacing:
      a. Comply with SMACNA 1884 and 1966.
      b. Install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
      c. Extend strap supports down both sides of ducts and turn under bottom at least 1 inch.
      d. Secure hanger to sides and bottom of ducts with sheet metal screws.
   5. Hangers Exposed to View: Provide threaded rod and angle or channel supports.
   6. Vertical Ducts:
      a. Support with steel angles or channel secured to sides of duct with welds, bolts, sheet metal screws, or blind rivets.
      b. Support at each floor and at maximum intervals of 16 feet.
   7. Upper Attachments:
      a. Attach to structures.

b. Selection and Sizing: Provide pull-out, tension, and shear capacities as required for supported loads and building materials.

8. Penetrations:
   a. Avoid penetrations of ducts with hanger rods.

3.04 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.

3.05 CLEANING

A. Section 017000 - Execution and Closeout Requirements: Requirements for cleaning.

B. Clean duct system and force air at high velocity through duct to remove accumulated dust.

3.06 ATTACHMENTS

A. Ductwork Material Schedule:
   1. Intake and Exhaust: Steel.

B. Ductwork Pressure Class Schedule:
   1. Constant Volume Supply: 1-inch wg, regardless of velocity.

END OF SECTION

SECTION 233400

HVAC FANS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Propeller fans.

B. Related Sections:
   1. Section 230700 - HVAC Insulation: Product requirements for power ventilators for placement by this section.
   2. Section 230900 - Instrumentation and Control for HVAC: Product requirements for control components to interface with fans.
   3. Section 233100 - HVAC Ducts and Casings: Product requirements for hangers for placement by this section.

1.02 REFERENCES

A. American Bearing Manufacturers Association:
   1. ABMA 9 - Load Ratings and Fatigue Life for Ball Bearings.

B. Air Movement and Control Association International, Inc.:
   1. AMCA 99 - Standards Handbook.

C. National Electrical Manufacturers Association:
   1. NEMA MG 1 - Motors and Generators.
   2. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

1.03 SUBMITTALS

A. Section 013300 - Shop Drawing Procedures: Submittal procedures.

B. Shop Drawings: Indicate size and configuration of fan assembly, mountings, weights, ductwork and accessory connections.

C. Product Data: Submit data on each type of fan and include accessories, fan curves with specified operating point plotted, power, RPM, sound power levels for both fan inlet and outlet at rated capacity, electrical characteristics and connection requirements.

D. Manufacturer's Installation Instructions: Submit fan manufacturer instructions.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.04 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.

B. Operation and Maintenance Data: Submit instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.05 QUALITY ASSURANCE

A. Performance Ratings: Conform to AMCA 210.

B. UL Compliance: UL listed and labeled, designed, manufactured, and tested in accordance with UL 705.

C. Balance Quality: Conform to AMCA 204.

D. Perform Work in accordance with New York State standards.

E. Maintain one copy of each document on site.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years' documented experience.

B. Installer: Company specializing in performing Work of this section with minimum three years’ experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Section 016500 – Transportation and Handling of Materials and Equipment and Section 016600 – Storage of Material.

B. Protect motors, shafts, and bearings from weather and construction dust.

1.08 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.09 WARRANTY

A. Section 017000 - Execution and Closeout Requirements: Product warranties and product bonds.

1.10 MAINTENANCE SERVICE

A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance service.

B. Furnish service and maintenance of fans for one year from Date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PROPELLER FANS

A. Furnish materials in accordance with New York State standards.

B. Fan: Refer to Mechanical plans for fan schedule and accessories.

C. Electrical Characteristics and Components:
1. Refer to equipment schedule on Mechanical plans for electrical requirements.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Secure wall fans with stainless steel screws to structure.

B. Install safety screen where inlet or outlet is exposed.

C. Install backdraft dampers on discharge of exhaust fans.

3.02 MANUFACTURER'S FIELD SERVICES

A. Section 014000 - Quality Requirements: Requirements for manufacturer's field services.

3.03 CLEANING

A. Section 017000 - Execution and Closeout Requirements: Requirements for cleaning.

3.04 DEMONSTRATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for demonstration and training.

B. Demonstrate fan operation.

3.05 PROTECTION OF FINISHED WORK

A. Section 017000 - Execution and Closeout Requirements: Requirements for protecting finished Work.

B. Do not operate fans for until ductwork is clean, filters in place, bearings lubricated, and fan has been test run under observation.

3.06 SCHEDULES

A. Propeller Fans:
   1. EF1:
      a. Refer to equipment schedule on Mechanical plans.

END OF SECTION

SECTION 235500

FUEL-FIRED HEATERS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Tubular infrared heaters.

B. Related Sections:
   1. Section 230900 - Instrumentation and Control for HVAC: Product requirements for thermostats and time clocks for placement by this section.
   2. Section 231123 - Facility Natural-Gas Piping: Product requirements for natural gas piping connected to gas-fired heaters.

1.02 REFERENCES

A. National Fire Protection Association:
   1. NFPA 54 - National Fuel Gas Code.
   2. NFPA 211 - Standard for Chimneys, Fireplaces, Vents, and Solid Fuel Burning Appliances.

1.03 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittals procedures.

B. Shop Drawings: Indicate assembly, required clearances, and locations and sizes of field connections.

C. Product Data: Submit manufacturer's literature and data indicating rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.

D. Manufacturer's Installation Instructions: Submit Indicate rigging and assembly.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.04 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Record actual locations of thermostats or other products not mounted on unit.

C. Operation and Maintenance Data: Submit manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts listing.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with New York State standards.

B. Maintain one copy of each document on site.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years' experience.

B. Installer: Company specializing in performing Work of this section with minimum three years' documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Section 016500 – Transportation and Handling of Materials and Equipment and Section 016600 – Storage of Material.

B. Accept heaters and controls on site in factory packaging. Inspect for damage.

1.08 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.09 WARRANTY

A. Section 017000 - Execution and Closeout Requirements: Product warranties and product bonds.

PART 2 - PRODUCTS

2.01 TUBULAR INFRARED HEATERS

A. Furnish materials in accordance with New York State standards.

B. Packaged, factory assembled, pre-wired unit consisting of cabinet, burner, heat exchanger, radiant tube, stainless steel reflector and controls for natural gas.

C. Heat Exchanger: Aluminized tubular steel combustion chamber with aluminized steel tube with stainless steel reflector.

D. Gas Burner:
   1. Gas Burner: Forced draft type.
   2. Gas valve provides 100 percent safety gas shut-off; 24-volt combining pressure regulation, safety pilot, manual set (On-Off), and automatic electric valve.
   3. Electric spark ignition module.
   4. Non-corrosive burner air blower with permanently lubricated motor.

E. Gas Burner Safety Controls: Three try 100% shut-off direct spark ignition control.

F. Controls: Low voltage pipe thermostat cycles burner to maintain pipe temperature setting.

G. Performance:
   1. Heating input:125,000 Btuh
   2. Gas heating capacities are sea level ratings.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Section 013000 - Administrative Requirements: Coordination and project conditions.

B. Verify space is ready for installation of units and openings are as indicated on shop drawings.

3.02 INSTALLATION

A. Install units in accordance with NFPA 90A and NFPA 54.

B. Installation - Natural Gas Piping:
   1. Connect natural gas piping in accordance with NFPA 54.
   2. Connect natural gas piping to unit, full size of unit gas train inlet. Arrange piping with clearances for burner service.

   3. Install the following piping accessories on natural gas piping connections. Refer to Section 231123 – Facility Natural Gas Piping.
      a. Shutoff valve.

3.03 SCHEDULES

A. Fuel-Fired Heaters:
   1. IH1 and IH2: Refer to mechanical plans.

END OF SECTION

SECTION 260503

EQUIPMENT WIRING CONNECTIONS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes electrical connections to equipment.

B. Related Sections:
   1. Section 260519 - Low-Voltage Electrical Power Conductors and Cables.
   2. Section 260533 - Raceway and Boxes for Electrical Systems.

1.02 REFERENCES

A. National Electrical Manufacturers Association:
   1. NEMA WD 1 - General Requirements for Wiring Devices.
   2. NEMA WD 6 - Wiring Devices-Dimensional Requirements.

B. National Fire Protection Association:
   1. NFPA 70-National Electrical Code

1.03 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Submittal procedures.

B. Product Data: Submit wiring device manufacturer’s catalog information showing dimensions, configurations, and construction.

C. Manufacturer's installation instructions.

1.04 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Submittal procedures.

B. Project Record Documents: Record actual locations, sizes, and configurations of equipment connections.

1.05 COORDINATION

A. Section 013113 – Project Coordination: Coordination and project conditions.

B. Obtain and review shop drawings, product data, manufacturer’s wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.

C. Determine connection locations and requirements.

D. Sequence rough-in of electrical connections to coordinate with installation of equipment.

E. Sequence electrical connections to coordinate with start-up of equipment.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.01 EXAMINATION

A. Section 013113 – Project Coordination: Coordination and project conditions.

B. Verify equipment is ready for electrical connection, for wiring, and to be energized.

3.02 EXISTING WORK

A. Remove exposed abandoned equipment wiring connections, including abandoned connections above accessible ceiling finishes.

B. Disconnect abandoned utilization equipment and remove wiring connections. Remove abandoned components when connected raceway is abandoned and removed. Install blank cover for abandoned boxes and enclosures not removed.

C. Extend existing equipment connections using materials and methods compatible with existing electrical installations, or as specified.

3.03 INSTALLATION

A. Make electrical connections.

B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.

C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.

D. Install receptacle outlet to accommodate connection with attachment plug.

E. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.

F. Install terminal block jumpers to complete equipment wiring requirements.

G. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

3.04 ADJUSTING

A. Section 017000 - Execution and Closeout Requirements: Testing, adjusting, and balancing.

B. Cooperate with utilization equipment installers and field service personnel during checkout and starting of equipment to allow testing and balancing and other startup operations. Provide personnel to operate electrical system and checkout wiring connection components and configurations.

END OF SECTION

SECTION 260519

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes building wire and cable; service entrance cable; armored cable; metal clad cable; and wiring connectors and connections.

B. Related Sections:
1. Section 260553 - Identification for Electrical Systems: Product requirements for wire identification.
2. Section 310513.95 - Restoration.
3. Section 312333 – Excavation, Backfill and Trenching.

1.02 REFERENCES

A. International Electrical Testing Association:
1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

B. National Fire Protection Association:
1. NFPA 70 - National Electrical Code.

C. Underwriters Laboratories, Inc.:
1. UL 1277 - Standard for Safety for Electrical Power and Control Cables with Optional Optical-Fiber Members.

1.03 SYSTEM DESCRIPTION

A. Product Requirements: Provide products as follows:
1. Stranded conductor for feeders and branch circuits.
2. Stranded conductors for control circuits.
3. Conductor not smaller than 12 AWG for power and lighting circuits.
4. Conductor not smaller than 16 AWG for control circuits.
5. Increase wire size in branch circuits to limit voltage drop to a maximum of 3 percent.

B. Wiring Methods: Provide the following wiring methods:
1. Concealed Dry Interior Locations: Use only building wire, Type THHN/THWN-2 insulation, in raceway, armored cable or metal clad cable.
2. Exposed Dry Interior Locations: Use only building wire, Type THHN/THWN-2 insulation, in raceway.
3. Above Accessible Ceilings: Use only building wire, Type THHN/THWN-2 insulation, in raceway, armored cable or metal clad cable.

4. Wet or Damp Interior Locations: Use only building wire, Type THWN-2 insulation, in raceway, armored cable, or metal clad cable.
5. Exterior Locations: Use only building wire, Type THWN-2 insulation, in raceway.
6. Underground Locations: Use only building wire, Type THWN-2 insulation, in raceway.

1.04 DESIGN REQUIREMENTS

A. Conductor sizes are based on copper unless indicated as aluminum or "AL".

B. When aluminum conductor is substituted for copper conductor, size to match circuit requirements, terminations, conductor ampacity and voltage drop. Aluminum conductor substitutions must be approved by the Owner/Engineer.

1.05 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Requirements for submittals.

B. Product Data: Submit for building wire and each cable assembly type.

C. Design Data: Indicate voltage drop and ampacity calculations for aluminum conductors substituted for copper conductors.

D. Test Reports: Indicate procedures and values obtained.

1.06 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record actual locations of components and circuits.

1.07 QUALITY ASSURANCE

A. Perform Work in accordance with local codes and standards

1.08 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

1.09 FIELD MEASUREMENTS

A. Verify field measurements are as indicated on Drawings.

1.10 COORDINATION

A. Section 013113 – Project Coordination: Requirements for coordination.

B. Where wire and cable destination is indicated and routing is not shown, determine routing and lengths required.

C. Wire and cable routing indicated is approximate unless dimensioned.

PART 2 - PRODUCTS

2.01 BUILDING WIRE

A. Product Description: Single conductor insulated wire.

B. Conductor: Copper.

C. Insulation Voltage Rating: 600 volts.

D. Minimum Insulation Temperature Rating: 90 degrees C.

E. Insulation Material: Thermoplastic.

F. Listings: wire shall be listed by approved third party testing agency such as UL or CSA.

2.02 COMMUNICATION RTD CABLE

A. Manufacturers:
   1. Houston Wire: H82550
   2. Beldon Cable: 83653
   3. General Cable: C8107
   4. Substitution: Section 012513 – Substitutions

B. Product Description: A fabricated assembly of insulated conductors, outer shield, and outer jacket.

C. Conductor: Three (3), #18 AWG, 19x30 stranding, tinned copper, FEP insulation.

D. Outer Shield: Tape – Bi-laminate (alum and poly), Braid – Tinned copper.

E. Outer Jacket: FEP

F. UL Voltage Rating: 300 volts.

G. UL Temperature Rating: 100 degrees C.

2.03 ARMORED CABLE

A. Manufacturers:
   1. General Cable
   2. Okonite Company
   3. Southwire Company
   4. Substitutions: Section 012513 – Substitution Procedures.

B. Product Description: A fabricated assembly or insulated conductors in a flexible interlocked metallic armor NFPA 70 Type AC.

C. Conductor: Copper.

D. Insulation Voltage Rating: 600 volts.

E. Minimum Insulation Temperature Rating: 90 degrees C.

F. Insulation Material: Thermoplastic.

G. Armor Material: Steel.

H. Armor Design: Corrugated tube.

I. Listings: wire shall be listed by approved third party testing agency such as UL or CSA.

2.04 METAL CLAD CABLE

A. Manufacturers:
   1. Okonite Company
   2. Southwire Company
   3. Substitutions: Section 012513 – Substitution Procedures.

B. Product Description: A factory assembly of one or more insulated circuit conductors with or without optical fiber members enclosed in an armor or corrugated metallic sheath NFPA 70 Type MC.

C. Conductor: Copper.

D. Insulation Voltage Rating: 600 volts.

E. Minimum Insulation Temperature Rating: 90 degrees C.

F. Insulation Material: Thermoplastic.

G. Armor Material: Aluminum.

H. Armor Design: Corrugated tube.

I. Jacket: PVC in damp and wet locations.

J. Listings: wire shall be listed by approved third party testing agency such as UL or CSA.

2.05 WIRING CONNECTORS

A. Manufacturers; Split Bolt Connectors:
1. Burndy
2. ILSCO
3. Thomas & Betts Corporation
4. Substitutions: Section 012513 - Substitutions.

B. Manufacturers; Solderless Pressure Connectors:
1. 3M
2. Ideal Industries, Inc.
3. Substitutions**:** Section 012513 - Substitutions.

C. Manufacturers; Spring Wire Connectors:
1. 3M
2. NELCO, Inc.
3. Substitutions: Section 012513 - Substitutions.

D. Manufacturers; Compression Connectors:
1. Burndy
2. Ideal Industries, Inc.
3. Leviton Manufacturing Company
4. Thomas & Betts Corporation
5. Section 012513 - Substitutions.

2.06 TERMINATIONS

A. Terminal Lugs for Wires 6 AWG and Smaller: Solderless, compression type copper.

B. Lugs for Wires 4 AWG and Larger: Color keyed, compression type copper, with insulating sealing collars.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Section 013113 – Project Coordination: Coordination and project conditions.

B. Verify interior of building has been protected from weather.

C. Verify mechanical work likely to damage wire and cable has been completed.

D. Verify raceway installation is complete and supported.

3.02 PREPARATION

A. Completely and thoroughly swab raceway before installing wire.

3.03 EXISTING WORK

A. Remove exposed abandoned wire and cable, including abandoned wire and cable above accessible ceiling finishes. Patch surfaces where removed cables pass through building finishes.

B. Disconnect abandoned circuits and remove circuit wire and cable. Remove abandoned boxes when wire and cable servicing boxes is abandoned and removed. Install blank cover for abandoned boxes not removed.

C. Provide access to existing wiring connections remaining active and requiring access. Modify installation or install access panel.

D. Extend existing circuits using materials and methods compatible with existing electrical installations, or as specified.

E. Clean and repair existing wire and cable remaining or wire and cable to be reinstalled.

3.04 INSTALLATION

A. Route wire and cable to meet Project conditions.

B. Neatly train and lace wiring inside boxes, equipment, and panelboards.

C. Identify and color code wire and cable under provisions of Section 260553. Identify each conductor with its circuit number or other designation indicated.

D. Special Techniques--Building Wire in Raceway:
   1. Pull conductors into raceway at same time.
   2. Install building wire 4 AWG and larger with pulling equipment.

E. Special Techniques - Cable:
   1. Protect exposed cable from damage.
   2. Support cables above accessible ceiling, using spring metal clips or plastic cable ties to support cables from structure. Do not rest cable on ceiling panels.
   3. Use suitable cable fittings and connectors.

F. Special Techniques - Wiring Connections:
   1. Clean conductor surfaces before installing lugs and connectors.
   2. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
   3. Tape uninsulated conductors and connectors with electrical tape to 150 percent of insulation rating of conductor.

4. Install split bolt connectors for copper conductor splices and taps, 6 AWG and larger.
5. Install solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
6. Install insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
7. Terminate aluminum conductors with tin-plated, aluminum-bodied compression connectors only. Fill with anti-oxidant compound before installing conductor.
8. Install suitable reducing connectors or mechanical connector adaptors for connecting aluminum conductors to copper conductors.

G. Install stranded conductors for branch circuits 10 AWG and smaller. Install crimp on fork terminals for device terminations. Do not place bare stranded conductors directly under screws.

H. Install terminal lugs on ends of 600 volt wires unless lugs are furnished on connected device, such as circuit breakers.

I. Size lugs in accordance with manufacturer's recommendations terminating wire sizes. Install 2-hole type lugs to connect wires 4 AWG and larger to copper bus bars.

J. For terminal lugs fastened together such as on motors, transformers, and other apparatus, or when space between studs is small enough that lugs can turn and touch each other, insulate for dielectric strength of 2-1/2 times normal potential of circuit.

3.05 WIRE COLOR

A. General:
1. For wire sizes 10 AWG and smaller, install wire colors in accordance with the following:
   a. Black and red for single phase circuits at 120/240 volts.
   b. Black, red, and blue for circuits at 120/208 volts single or three phase.
   c. Phase A – brown, Phase B – Orange, and Phase C - yellow for circuits at 277/480 volts single or three phase.
2. For wire sizes 8 AWG and larger, identify wire with colored tape at terminals, splices and boxes. Colors are as follows:
   a. Black and red for single phase circuits at 120/240 volts.
   b. Black, red, and blue for circuits at 120/208 volts single or three phase.
   c. Phase A – brown, Phase B – Orange, and Phase C - yellow for circuits at 277/480 volts single or three phase.

B. Neutral Conductors: White for 120/208 volts. Gray for 277/480V. When two or more neutrals are located in one conduit, individually identify each with proper circuit number.

C. Branch Circuit Conductors: Install three or four wire home runs with each phase uniquely color coded.

D. Feeder Circuit Conductors: Uniquely color code each phase.

E. Ground Conductors:
   1. For 6 AWG and smaller: Green.
   2. For 4 AWG and larger: Identify with green tape at both ends and visible points including junction boxes.

3.06 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements and 017000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Perform inspections and tests listed in NETA ATS, Section 7.3.1.

END OF SECTION

SECTION 260526

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Rod electrodes.
   2. Wire.
   3. Mechanical connectors.
   4. Exothermic connections.

B. Related Sections:
   1. Section 032000 - Concrete Reinforcing: Bonding or welding bars when reinforcing steel is used for electrodes.
   2. Section 337900 - Site Grounding: Site related grounding components for buildings and facilities.

1.02 REFERENCES

A. Institute of Electrical and Electronics Engineers:
   1. IEEE 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems.
   2. IEEE 1100 - Recommended Practice for Powering and Grounding Electronic Equipment.

B. International Electrical Testing Association:
   1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

C. National Fire Protection Association:
   1. NFPA 70 - National Electrical Code.

1.03 SYSTEM DESCRIPTION

A. Grounding systems use the following elements as grounding electrodes:
   1. Existing electrical service grounding.
   2. Existing metal underground water pipe.
   3. Concrete-encased electrode.
   4. Rod electrode.

1.04 PERFORMANCE REQUIREMENTS

A. Grounding System Resistance: 5 ohms maximum.

1.05 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Requirements for submittals.

B. Product Data: Submit data on grounding electrodes and connections.

C. Test Reports: Indicate overall resistance to ground and resistance of each electrode, where possible.

D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.06 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record actual locations of components and grounding electrodes.

1.07 QUALITY ASSURANCE

A. Provide grounding materials conforming to requirements of NEC, IEEE 142, and UL labeled.

B. Perform Work in accordance with local codes and standards.

1.08 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years experience.

B. Installer: Company specializing in performing work of this section.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Section 016500 – Transportation and Handling of Materials and Equipment: Requirements for transporting and handling products.

B. Section 016600 – Storage of Material – Requirements for storing and protecting products.

C. Accept materials on site in original factory packaging, labeled with manufacturer's identification.

D. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.

E. Do not deliver items to project before time of installation. Limit shipment of bulk and multiple-use materials to quantities needed for immediate installation.

1.10 COORDINATION

A. Section 013113 – Project Coordination: Requirements for coordination.

PART 2 - PRODUCTS

2.01 ROD ELECTRODES

A. Product Description:
   1. Material: Copper-clad steel.
   2. Diameter: 3/4 inch.
   3. Length: 10 feet.

B. Connector: Connector for exothermic welded connection at all buried connections and U-bolt clamp at exposed connections (or in ground wells).

2.02 WIRE

A. Material: Stranded copper.

B. Foundation Electrodes: 2 AWG.

C. Grounding Electrode Conductor: Copper conductor bare.

D. Bonding Conductor: Copper conductor bare.

2.03 MECHANICAL CONNECTORS

A. Manufacturers:
   1. Burndy
   2. ERICO International Corporation
   3. Harger Lightning and Grounding
   4. Substitutions: Section 012513 - Substitutions.

B. Description: Bronze connectors, suitable for grounding and bonding applications, in configurations required for particular installation.

2.04 EXOTHERMIC CONNECTIONS

A. Manufacturers:
   1. Burndy
   2. ERICO International Corporation
   3. Harger Lightning and Grounding
   4. Substitutions: Section 012513 - Substitutions.

B. Product Description: Exothermic materials, accessories, and tools for preparing and making permanent field connections between grounding system components.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Section 013113 – Project Coordination: Verification of existing conditions before starting work.

B. Verify final backfill and compaction has been completed before driving rod electrodes.

3.02 PREPARATION

A. Remove paint, rust, mill oils, surface contaminants at connection points.

3.03 EXISTING WORK

A. Modify existing grounding system to maintain continuity to accommodate renovations.

B. Extend existing grounding system using materials and methods compatible with existing electrical installations, or as specified.

3.04 INSTALLATION

A. Install in accordance with IEEE 142 and 1100.

B. Install rod electrodes at locations as indicated on Drawings. Install additional rod electrodes to achieve specified resistance to ground.

C. Install grounding and bonding conductors concealed from view.

D. Install grounding electrode conductor and connect to reinforcing steel in foundation footing as indicated on Drawings. Electrically bond steel together.

E. Bond together metal siding not attached to grounded structure; bond to ground.

F. Bond together reinforcing steel and metal accessories in structures.

G. Equipment Grounding Conductor: Install separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

H. Connect to site grounding system. Refer to Section 337900 – Site Grounding.

I. Permanently ground entire light and power system in accordance with NEC, including service equipment, distribution panels, lighting panelboards, switch and starter enclosures, motor frames, grounding type receptacles, and other exposed non-current carrying metal parts of electrical equipment.

J. Accomplish grounding of electrical system by using insulated grounding conductor installed with feeders and branch circuit conductors in conduits. Size grounding conductors in accordance with NEC. Install from grounding bus of serving panel to ground bus of served panel, grounding screw of receptacles, lighting fixture housing, light switch outlet boxes or metal enclosures of service equipment. Ground conduits by means of grounding bushings on terminations at panelboards with installed number 12 conductor to grounding bus.

K. Permanently attach equipment and grounding conductors prior to energizing equipment.

3.05 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements and 017000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Grounding and Bonding: Perform inspections and tests listed in NETA ATS, Section 7.13.

D. Perform ground resistance testing in accordance with IEEE 142.

E. Perform leakage current tests in accordance with NFPA 99.

F. Perform continuity testing in accordance with IEEE 142.

G. When improper grounding is found on receptacles, check receptacles in entire project and correct. Perform retest.

END OF SECTION

SECTION 260529

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Conduit supports.
   2. Formed steel channel.
   3. Spring steel clips.
   4. Sleeves.
   5. Mechanical sleeve seals.

B. Related Sections:
   1. Section 033000 - Cast-In-Place Concrete: Product requirements for concrete for placement by this section.

1.02 REFERENCES

A. ASTM International:
   1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
   2. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
   3. ASTM E814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
   4. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems.

B. FM Global:
   1. FM - Approval Guide, A Guide to Equipment, Materials & Services Approved By Factory Mutual Research For Property Conservation.

C. National Fire Protection Association:
   1. NFPA 70 - National Electrical Code.

D. Underwriters Laboratories Inc.:
   1. UL 263 - Fire Tests of Building Construction and Materials.
   2. UL 723 - Tests for Surface Burning Characteristics of Building Materials.
   3. UL 1479 - Fire Tests of Through-Penetration Firestops.
   4. UL 2079 - Tests for Fire Resistance of Building Joint Systems.
   5. UL - Fire Resistance Directory.

E. Intertek Testing Services (Warnock Hersey Listed):
   1. WH - Certification Listings.

1.03 SYSTEM DESCRIPTION

A. Firestopping Materials: Comply with local authority having jurisdiction.

1.04 PERFORMANCE REQUIREMENTS

A. Firestopping Materials: Comply with local authority having jurisdiction.

1.05 SUBMITTALS

A. Section 013113 – Project Coordination: Requirements for submittals.

B. Shop Drawings: Indicate system layout with location and detail of trapeze hangers.

C. Product Data:
   1. Hangers and Supports: Submit manufacturers catalog data including load capacity.
   2. Firestopping: Submit data on product characteristics, performance and limitation criteria.

D. Firestopping Schedule: Submit schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance rating of adjacent assembly.

E. Design Data: Indicate load carrying capacity of hangers and supports.

F. Manufacturer's Installation Instructions:
   1. Hangers and Supports: Submit special procedures and assembly of components.
   2. Firestopping: Submit preparation and installation instructions.

G. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with local codes and standards.

1.07 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years experience.

B. Installer: Company specializing in performing work of this section.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Section 016500 – Transportation and Handling of Materials and Equipment: Requirements for transporting and handling products.

B. Section 016600 – Storage of Material: Requirements for storing and protecting products.

C. Accept materials on site in original factory packaging, labeled with manufacturer's identification.

D. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.

1.09 ENVIRONMENTAL REQUIREMENTS

A. Section 016500 – Transportation and Handling of Materials and Equipment and Section 016600 – Storage of Material: Environmental conditions affecting products on site.

PART 2 - PRODUCTS

2.01 CONDUIT SUPPORTS

A. Hanger Rods: Threaded high tensile strength galvanized carbon steel with free running threads.

B. Beam Clamps: Malleable Iron, with tapered hole in base and back to accept either bolt or hanger rod. Set screw: hardened steel.

C. Conduit clamps for trapeze hangers: Galvanized steel, notched to fit trapeze with single bolt to tighten.

D. Conduit clamps - general purpose: One hole malleable iron for surface mounted conduits.

E. Cable Ties: High strength nylon temperature rated to 185 degrees F. Self locking.

2.02 FORMED STEEL CHANNEL

A. Product Description: Galvanized 12 gauge thick steel. With holes 1-1/2 inches on center.

2.03 SPRING STEEL CLIPS

A. Product Description: Mounting hole and screw closure.

2.04 SLEEVES

A. Furnish materials in accordance with local standards.

B. Sleeves for conduits Through Non-fire Rated Floors: 18 gage thick galvanized steel.

C. Sleeves for conduit Through Fire Rated and Fire Resistive Floors and Walls, and Fire Proofing: Prefabricated fire rated sleeves including seals, UL listed.

D. Stuffing Insulation: Glass fiber type, non-combustible.

2.05 MECHANICAL SLEEVE SEALS

A. Manufacturers:
   1. Link-Seal,
   2. Heidenreich
   3. Substitutions: Section 012513 – Substitution Procedures.

B. Product Description: Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between object and sleeve, connected with bolts and pressure plates causing rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

2.06 FIRESTOPPING ACCESSORIES

A. Installation Accessories: Comply with requirements of local authority having jurisdiction.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Section 013113 – Project Coordination: Verification of existing conditions before starting work.

B. Verify openings are ready to receive sleeves.

3.02 INSTALLATION - HANGERS AND SUPPORTS

A. Anchors and Fasteners:
   1. Concrete Structural Elements: Provide expansion anchors.
   2. Steel Structural Elements: Provide beam clamps.
   3. Concrete Surfaces: Provide expansion anchors.
   4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Provide toggle bolts.
   5. Solid Masonry Walls: Provide expansion anchors.

6. Sheet Metal: Provide sheet metal screws.
7. Wood Elements: Provide wood screws.

B. Install conduit and raceway support and spacing in accordance with NEC.

C. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.

D. Install multiple conduit runs on common hangers.

E. Supports:
1. Fabricate supports from structural steel or formed steel channel. Install hexagon head bolts to present neat appearance with adequate strength and rigidity. Install spring lock washers under nuts.
2. Install surface mounted cabinets and panelboards with minimum of four anchors.
3. In wet and damp locations install steel channel supports to stand cabinets and panelboards 1 inch off wall.

3.03 INSTALLATION - FIRESTOPPING

A. Firestopping Materials: Comply with requirements of local authority having jurisdiction.

3.04 INSTALLATION - EQUIPMENT BASES AND SUPPORTS

A. Provide housekeeping pads of concrete, minimum 3-1/2 inches thick and extending 3 inches beyond supported equipment. Refer to Section 033000 – Cast-in-Place Concrete.

B. Using templates furnished with equipment, install anchor bolts, and accessories for mounting and anchoring equipment.

C. Construct supports of formed steel channel. Brace and fasten with flanges bolted to structure.

3.05 INSTALLATION

A. Exterior watertight entries: Core drill concrete and seal with adjustable interlocking rubber links and grout both sides.

B. Set sleeves in position in forms. Provide reinforcing around sleeves.

C. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.

D. Extend sleeves through equipment pads 1 inch above finished level. Caulk sleeves.

3.06 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements and 017000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Inspect installed firestopping for compliance with specifications and submitted schedule.

3.07 CLEANING

A. Section 017000 - Execution and Closeout Requirements: Requirements for cleaning.

3.08 PROTECTION OF FINISHED WORK

A. Section 017000 - Execution and Closeout Requirements: Requirements for protecting finished Work.

B. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 260533

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes conduit and tubing, surface raceways, wireways, outlet boxes, pull and junction boxes, and handholes.

B. Related Sections:
1. Section 260503 - Equipment Wiring Connections.
2. Section 260526 - Grounding and Bonding for Electrical Systems.
3. Section 260529 - Hangers and Supports for Electrical Systems.
4. Section 260553 - Identification for Electrical Systems.
5. Section 262716 - Electrical Cabinets and Enclosures.
6. Section 262726 - Wiring Devices.
7. Section 337119 - Electrical Underground Ducts and Manholes.

1.02 REFERENCES

A. American National Standards Institute:
1. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
2. ANSI C80.3 - Specification for Electrical Metallic Tubing, Zinc Coated.
3. ANSI C80.5 - Aluminum Rigid Conduit - (ARC).

B. National Electrical Manufacturers Association:
1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
2. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
3. NEMA OS 1 - Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
4. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
5. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
6. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

C. National Fire Protection Agency
1. NFPA 70-National Electrical Code

1.03 SYSTEM DESCRIPTION

A. Raceway and boxes located as indicated on Drawings, and at other locations required for splices, taps, wire pulling, equipment connections, and compliance with regulatory requirements. Raceway and boxes are shown in approximate locations unless dimensioned. Provide raceway to complete wiring system.

B. Underground More than 5 feet outside Foundation Wall: Provide thickwall nonmetallic conduit. Provide cast metal boxes or nonmetallic handhole.

C. Underground Within 5 feet from Foundation Wall: Provide rigid steel conduit. Provide cast metal or nonmetallic boxes.

D. In or Under Slab on Grade: Provide rigid steel conduit. Provide cast or nonmetallic metal boxes.

E. Outdoor Locations, Above Grade: Provide rigid steel or aluminum conduit. Provide cast metal or nonmetallic outlet, pull, and junction boxes.

F. Wet and Damp Locations: Provide rigid steel or aluminum conduit. Provide cast metal or nonmetallic outlet, junction, and pull boxes. Provide flush mounting outlet box in finished areas.

G. Exposed Dry Locations: Provide rigid steel or intermediate metal conduit unless otherwise specified on the drawings. Provide sheet-metal boxes. Provide flush mounting outlet box in finished areas. Provide hinged enclosure for large pull boxes.

1.04 DESIGN REQUIREMENTS

A. Minimum Raceway Size: 3/4 inch unless otherwise specified.

1.05 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Submittal procedures.

B. Product Data: Submit for the following:
1. Flexible metal conduit.
2. Liquidtight flexible metal conduit.
3. Nonmetallic conduit.
4. Flexible nonmetallic conduit.
5. Raceway fittings.
6. Conduit bodies.
7. Surface raceway.
8. Wireway.
9. Pull and junction boxes.
10. Handholes.

C. Manufacturer's Installation Instructions: Submit application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.06 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents:
   1. Record actual routing of conduits larger than 2 inch.
   2. Record actual routing of all under/in slab conduits.
   3. Record actual locations and mounting heights of outlet, pull, and junction boxes.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Section 016500 – Transportation and Handling of Materials and Equipment: Requirements for transporting and handling products.

B. Section 016600 – Storage of Material: Requirements for storing and protecting products.

C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

D. Protect PVC conduit from sunlight.

1.08 COORDINATION

A. Section 013113 – Project Coordination: Coordination and project conditions.

B. Coordinate installation of outlet boxes for equipment connected under Section 260503 – Equipment Wiring Connections.

C. Coordinate mounting heights, orientation and locations of outlets mounted above counters, benches, and backsplashes.

PART 2 - PRODUCTS

2.01 METAL CONDUIT

A. Manufacturers:
   1. Allied Tube & Conduit
   2. EGS/Appleton Electric
   3. Republic Conduit
   4. Thomas & Betts Corporation
   5. Wheatland Tube Company
   6. Substitutions: Section 012513 - Substitutions.

B. Rigid Steel Conduit: ANSI C80.1.

C. Rigid Aluminum Conduit: ANSI C80.5.

D. Intermediate Metal Conduit (IMC): Rigid steel.

E. Fittings and Conduit Bodies: NEMA FB 1; material to match conduit.

2.02 FLEXIBLE METAL CONDUIT

A. Manufacturers:
   1. AFC Cable Systems, Inc.
   2. EGS/Appleton Electric
   3. Southwire Company
   4. Substitutions: Section 012513 - Substitutions.

B. Product Description: Interlocked steel or aluminum construction.

C. Fittings: NEMA FB 1.

2.03 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

A. Manufacturers:
   1. AFC Cable Systems, Inc.
   2. Anamet Electrical, Inc.
   3. Carlon Electrical Products
   4. EGS/Appleton Electric
   5. Southwire Company
   6. Substitutions: Section 012513 - Substitutions.

B. Product Description: Interlocked steel or aluminum construction with PVC jacket.

C. Fittings: NEMA FB 1.

2.04 ELECTRICAL METALLIC TUBING (EMT)

A. Manufacturers:
   1. Carlon Electrical Product
   2. Emerson Process Management
   3. Republic Conduit
   4. Western Tube and Conduit
   5. Wheatland Tube Company
   6. Substitutions: Section 012513 - Substitutions.

B. Product Description: ANSI C80.3; galvanized tubing.

C. Fittings and Conduit Bodies: NEMA FB 1; steel, compression or set screw type.

2.05 NONMETALLIC CONDUIT

A. Manufacturers:
   1. Carlon Electrical Product
   2. EGS/Appleton Electric
   3. Hubbell Premise Wiring
   4. Substitutions: Section 012513 - Substitutions.

B. Product Description: NEMA TC 2; Schedule 80 PVC.

C. Fittings and Conduit Bodies: NEMA TC 3.

2.06 WIREWAY

A. Manufacturers:
   1. Carlon Electrical Product
   2. Cooper B-Line, Inc.
   3. Hammond Mfg. Co., Inc.
   4. Hoffman
   5. Panduit Corp.
   6. Square D
   7. Stahlin Non-metallic Encl.
   8. Wiremold/Legrand
   9. Substitutions: Section 012513 - Substitutions.

B. Product Description: General purpose type wireway.

C. Knockouts: Manufacturer's standard.

D. Size: As indicated on Drawings.

E. Cover: Hinged cover.

F. Connector: Flanged.

G. Finish: Rust inhibiting primer coating with gray enamel finish.

2.07 OUTLET BOXES

A. Manufacturers:
   1. Carlon Electrical Product
   2. RACO
   3. Substitutions: Section 012513 - Substitutions.

B. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
   1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; furnish 1/2 inch male fixture studs where required.
   2. Concrete Ceiling Boxes: Concrete type.

C. Cast Boxes: NEMA FB 1, Type FD, aluminum. Furnish gasketed cover by box manufacturer. Furnish threaded hubs.

D. Wall Plates: As specified in Section 262726 – Wiring Devices.

2.08 PULL AND JUNCTION BOXES

A. Manufacturers:
1. Hoffman
2. Kraloy
3. RACO
4. Substitutions: Section 012513 - Substitutions.

B. Sheet Metal Boxes: NEMA OS 1, galvanized steel.

C. Hinged Enclosures: As specified in Section 262716 – Electrical Cabinets and Enclosures.

D. Surface Mounted Cast Metal Box: NEMA 250, Type 4X; flat-flanged, surface mounted junction box:
1. Material: Cast aluminum.
2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Section 013113 – Project Coordination: Coordination and project conditions.

B. Verify outlet locations and routing and termination locations of raceway prior to rough-in.

3.02 EXISTING WORK

A. Remove exposed abandoned raceway. Cut raceway flush with walls and floors, and patch surfaces.

B. Remove concealed abandoned raceway to its source.

C. Disconnect abandoned outlets and remove devices. Remove abandoned outlets when raceway is abandoned and removed. Install blank cover for abandoned outlets not removed.

D. Maintain access to existing boxes and other installations remaining active and requiring access. Modify installation or provide access panel.

E. Extend existing raceway and box installations using materials and methods compatible with existing electrical installations, or as specified.

F. Clean and repair existing raceway and boxes to remain or to be reinstalled.

3.03 INSTALLATION

A. Ground and bond raceway and boxes in accordance with Section 260526 – Grounding and Bonding for Electrical Systems.

B. Fasten raceway and box supports to structure and finishes in accordance with Section 260529 – Hangers and Supports for Electrical Systems.

C. Identify raceway and boxes in accordance with Section 260553 – Identification for Electrical Systems.

D. Arrange raceway and boxes to maintain headroom and present neat appearance.

3.04 INSTALLATION - RACEWAY

A. Raceway routing is shown in approximate locations unless dimensioned. Route to complete wiring system.

B. Arrange raceway supports to prevent misalignment during wiring installation.

C. Support raceway using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.

D. Group related raceway; support using conduit rack. Construct rack using steel channel specified in Section 260529 -Hangers and Supports for Electrical Systems; provide space on each for 25 percent additional raceways.

E. Do not support raceway with wire or perforated pipe straps. Remove wire used for temporary supports

F. Do not attach raceway to ceiling support wires or other piping systems.

G. Construct wireway supports from steel channel specified in Section 260529 – Hangers and Supports for Electrical Systems.

H. Route exposed raceway parallel and perpendicular to walls.

I. Route raceway installed above accessible ceilings parallel and perpendicular to walls.

J. Route conduit under slab from point-to-point.

K. Maximum Size Conduit in Slab Above Grade: 3/4 inch. Do not cross conduits in slab.

L. Maintain clearance between raceway and piping for maintenance purposes.

M. Maintain 12 inch clearance between raceway and surfaces with temperatures exceeding 104 degrees F.

N. Cut conduit square using saw or pipe cutter; de-burr cut ends.

O. Bring conduit to shoulder of fittings; fasten securely.

P. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for minimum 20 minutes.

Q. Install conduit hubs to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.

R. Install no more than equivalent of three 90 degree bends between boxes. Install conduit bodies to make sharp changes in direction, as around beams. Install factory elbows for bends in metal conduit larger than 2 inch size.

S. Avoid moisture traps; install junction box with drain fitting at low points in conduit system.

T. Install fittings to accommodate expansion and deflection where raceway crosses seismic, control and expansion joints.

U. Install suitable pull string or cord in each empty raceway except sleeves and nipples.

V. Install suitable caps to protect installed conduit against entrance of dirt and moisture.

W. Close ends and unused openings in wireway.

3.05 INSTALLATION - BOXES

A. Install wall mounted boxes at elevations to accommodate mounting heights as indicated on Drawings.

B. Orient boxes to accommodate wiring devices oriented as specified in Section 262726 – Wiring Devices.

C. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.

D. Install adjustable steel channel fasteners for hung ceiling outlet box.

E. Do not fasten boxes to ceiling support wires or other piping systems.

F. Support boxes independently of conduit.

G. Install gang box where more than one device is mounted together. Do not use sectional box.

3.06 INTERFACE WITH OTHER PRODUCTS

A. Locate outlet boxes to allow luminaires positioned as indicated on Drawings.

B. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.

3.07 ADJUSTING

A. Section 017000 - Execution and Closeout Requirements: Testing, adjusting, and balancing.

B. Install knockout closures in unused openings in boxes.

3.08 CLEANING

A. Section 017000 - Execution and Closeout Requirements: Final cleaning.

B. Clean interior of boxes to remove dust, debris, and other material.

C. Clean exposed surfaces and restore finish.

END OF SECTION

SECTION 260553

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Nameplates.
   2. Wire markers.
   3. Underground Warning Tape.
   4. Lockout Devices.

1.02 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Product Data:
   1. Submit manufacturer’s catalog literature for each product required.
   2. Submit electrical identification schedule including list of wording, symbols, letter size, color coding, tag number, location, and function.

C. Manufacturer's Installation Instructions: Indicate installation instructions, special procedures, and installation.

1.03 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record actual locations of tagged devices; include tag numbers.

1.04 QUALITY ASSURANCE

A. Perform Work in accordance with local codes and standards.

1.05 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years experience.

B. Installer: Company specializing in performing Work of this section with three (3) years experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Section 016500 – Transportation and Handling of Materials and Equipment: Requirements for transporting and handling products.

B. Section 016600 – Storage of Material: Requirements for storing and protecting products.

C. Accept identification products on site in original containers. Inspect for damage.

D. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.

E. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Section 016500 – Transportation and Handling of Materials and Equipment and Section 016600 – Storage of Material: Environmental conditions affecting products on site.

B. Install labels and nameplates only when ambient temperature and humidity conditions for adhesive are within range recommended by manufacturer.

1.08 EXTRA MATERIALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for extra materials.

PART 2 - PRODUCTS

2.01 NAMEPLATES

A. Product Description: Laminated three-layer plastic with engraved white letters on black contrasting background color.

B. Letter Size:
1. 1/8 inch high letters for identifying individual equipment and loads.
2. 1/4 inch high letters for identifying grouped equipment and loads.

C. Minimum nameplate thickness: 1/8 inch.

2.02 WIRE MARKERS

A. Manufacturers:
1. Brady ID
2. Ideal Industries, Inc.
3. Substitutions: Section 012513 – Substitution Procedures.

B. Description: Cloth tape, split sleeve, or tubing type wire markers.

C. Legend:
1. Power and Lighting Circuits: Branch circuit or feeder number as indicated on Drawings.

2. Control Circuits: Control wire number as indicated on Drawings.

2.03 UNDERGROUND WARNING TAPE

A. Description: 4 inch wide detectable type, colored red with suitable warning legend describing buried electrical lines.

2.04 LOCKOUT DEVICES

A. Lockout Hasps:
1. Manufacturers:
a. Brady ID
b. Master Lock Company, LLC
c. Substitutions: 012513 – Substitution Procedures.
2. Anodized aluminum hasp with erasable label surface; size minimum 7-1/4 x 3 inches.

PART 3 - EXECUTION

3.01 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.02 EXISTING WORK

A. Install identification on existing equipment to remain in accordance with this section.

B. Install identification on unmarked existing equipment.

C. Replace lost nameplates, labels, and markers as field required.

3.03 INSTALLATION

A. Install identifying devices after completion of painting.

B. Nameplate Installation:
1. Install nameplate parallel to equipment lines.
2. Install nameplate for each electrical distribution and control equipment enclosure with corrosive-resistant mechanical fasteners, or adhesive.
3. Install nameplates for each control panel and major control components located outside panel with corrosive-resistant mechanical fasteners, or adhesive.
4. Secure nameplate to equipment front using adhesive.
5. Secure nameplate to inside surface of door on recessed panelboard in finished locations.
6. Install nameplates for the following:
a. Panelboards.
b. Transformers.

c. Service Disconnects.
d. Transfer Switches.
e. Enclosed Motor Starters.
f. Control Panels.

C. Wire Marker Installation:
1. Install wire marker for each conductor at panelboard gutters, pull boxes and junction boxes.
2. Mark data cabling at each end. Install additional marking at accessible locations along the cable run.

D. Underground Warning Tape Installation:
1. Install underground warning tape along length of each underground conduit, raceway, or cable 6 to 8 inches below finished grade, directly above buried conduit, raceway, or cable.

END OF SECTION

SECTION 262200

LOW-VOLTAGE TRANSFORMERS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Two-winding transformers.

B. Related Requirements:
   1. Section 033000 - Cast-In-Place Concrete: Housekeeping pads.
   2. Section 260526 - Grounding and Bonding for Electrical Systems.
   3. Section 260529 - Hangers and Supports for Electrical Systems.
   4. Section 260533 - Raceway and Boxes for Electrical Systems.
   5. Section 260553 - Identification for Electrical Systems.

1.02 REFERENCE STANDARDS

A. National Electrical Manufacturers Association:
   1. NEMA ST 1 - Specialty Transformers (Except General Purpose Type).
   2. NEMA ST 20 - Dry Type Transformers for General Applications.

B. International Electrical Testing Association:
   1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

1.03 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Submittal procedures.

B. Product Data: Submit outline and support point dimensions of enclosures and accessories, unit weight, voltage, kVA, and impedance ratings and characteristics, tap configurations, insulation system type, and rated temperature rise.

C. Test and Evaluation Reports: Indicate loss data, efficiency at 25, 50, 75 and 100 percent rated load, and sound level.

D. Source Quality Control Submittals: Indicate results of factory tests and inspections.

E. Field Quality Control Submittals: Indicate results of Contractor furnished tests and inspections.

1.04 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.

B. Record Documentation: Record actual locations of transformers.

1.05 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Section 016500 – Transportation and Handling of Materials and Equipment: Requirements for transporting and handling products.

B. Section 016600 – Storage of Material: Requirements for storing and protecting products.

C. Store in clean, dry space. Maintain factory wrapping or provide additional canvas or plastic cover to protect units from dirt, water, construction debris, and traffic.

D. Handle in accordance with manufacturer's written instructions. Lift only with lugs provided. Handle carefully to avoid damage to transformer internal components, enclosure, and finish.

PART 2 - PRODUCTS

2.01 TWO-WINDING TRANSFORMERS

A. Manufacturers:
   1. Eaton Corporation
   2. General Electric Company
   3. Schneider Electric USA
   4. Siemens
   5. Substitutions: Section 012513 – Substitution Procedures.

B. Description: NEMA ST 20, factory-assembled, air-cooled, dry type transformers , ratings as indicated on Drawings.

C. Operation:
   1. Primary Voltage: 480 volts, 3 phase.
   2. Secondary Voltage: 120/240 volts, 1 phase.
   3. Insulation system and average winding temperature rise for rated kVA as follows:
   4. 1-15 kVA: Class 180 with 115 degrees C rise.
   5. 16-500 kVA: Class 220 with 150 degrees C rise.
   6. Case temperature: Do not exceed 35 degrees C rise above ambient at warmest point at full load.

7. Winding Taps:
    a. Transformers Less than 15 kVA: Two 2.5 percent below rated voltage, full capacity taps on primary winding.
    b. Transformers 15 kVA and Larger: two 2.5% below and two 2.5% above.
8. Sound Levels: NEMA ST 20.
9. Basic Impulse Level: 10 kV.
10. Mounting:
    a. 1-15 kVA: Suitable for wall mounting.
    b. 16-75 kVA: Suitable for wall, floor, or trapeze mounting.
    c. Larger than 75 kVA: Suitable for floor mounting.

D. Materials:
1. Ground core and coil assembly to enclosure by means of visible flexible copper grounding strap.
2. Coil Conductors: Continuous copper windings with terminations brazed or welded.
3. Enclosure: NEMA ST 20, as indicated on the drawings. Furnish lifting eyes or brackets.

E. Fabrication:
1. Isolate core and coil from enclosure using vibration-absorbing mounts.
2. Nameplate: Include transformer connection data.

2.02 SOURCE QUALITY CONTROL

A. Section 014000 - Quality Requirements: Testing, inspection and analysis requirements.

B. Production test each unit according to NEMA ST20.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.

B. Verify mounting supports are properly sized and located including concealed bracing in walls.

3.02 PREPARATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.

B. Provide concrete pads under provisions of Section 033000 – Cast-in-Place Concrete.

3.03 DEMOLITION

A. Disconnect and remove abandoned transformers.

B. Maintain access and adequate ventilation to existing transformers and other installations remaining active and requiring access and ventilation. Modify installation or provide access panel or ventilation grilles.

3.04 INSTALLATION

A. Set transformer plumb and level.

B. Use flexible conduit, in accordance with Section 260533 – Raceway and Boxes for Electrical Systems, 2 feet minimum length, for connections to transformer case. Make conduit connections to side panel of enclosure.

C. Support transformers in accordance with Section 260529 – Hangers and Supports for Electrical Systems.
   1. Mount wall-mounted transformers using integral flanges or accessory brackets furnished by manufacturer.
   2. Mount floor-mounted transformers on vibration isolating pads suitable for isolating transformer noise from building structure.
   3. Mount trapeze-mounted transformers as indicated on Drawings and/or recommended by the manufacturer.

D. Provide seismic restraints.

E. Install grounding and bonding in accordance with Section 260526 – Grounding and Bonding for Electrical Systems.

3.05 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.

B. Section 017000 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.

C. Inspect and test in accordance with NETA ATS, except Section 4.

D. Perform inspections and tests listed in NETA ATS, Section 7.2.1.

3.06 ADJUSTING

A. Section 017000 - Execution and Closeout Requirements: Testing, adjusting, and balancing.

B. Measure primary and secondary voltages and make appropriate tap adjustments.

3.07 CLEANING

A. Section 017000 - Execution and Closeout Requirements: Requirements for cleaning.

B. Clean existing transformers to remain or to be reinstalled.

END OF SECTION

SECTION 262416

PANELBOARDS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Distribution and branch circuit panelboards.

B. Related Requirements:
   1. Section 260526 - Grounding and Bonding for Electrical Systems.
   2. Section 260553 - Identification for Electrical Systems.

1.02 REFERENCE STANDARDS

A. Institute of Electrical and Electronics Engineers:
   1. IEEE C62.41 - Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits.

B. National Electrical Manufacturers Association:
   1. NEMA ICS 2 - Industrial Control and Systems: Controllers, Contactors, and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC.
   2. NEMA ICS 5 - Industrial Control and Systems: Control Circuit and Pilot Devices.
   3. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).
   4. NEMA PB 1 - Panelboards.
   5. NEMA PB 1.1 - General Instructions for Proper Installation, Operation, and Maintenance of Panelboards Rated 600 Volts or Less.

C. International Electrical Testing Association:
   1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

D. National Fire Protection Association:
   1. NFPA 70 - National Electrical Code.

E. Underwriters Laboratories Inc.:
   1. UL 50 - Cabinets and Boxes
   2. UL 67 - Safety for Panelboards.
   3. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures.
   4. UL 1449 - Transient Voltage Surge Suppressors.
   5. UL 1699 - Arc-Fault Circuit Interrupters.

1.03 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Requirements for submittals.

B. Product Data: Submit catalog data showing specified features of standard products.

C. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.

1.04 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record actual locations of panelboards and record actual circuiting arrangements.

C. Operation and Maintenance Data: Submit spare parts listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

1.05 MAINTENANCE MATERIAL SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance products.

B. Extra Stock Materials:
   1. Furnish two of each panelboard key. Panelboards keyed alike.

1.06 QUALITY ASSURANCE

A. Qualifications
   1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

PART 2 - PRODUCTS

2.01 DISTRIBUTION PANELBOARDS

A. Manufacturers:
   1. Eaton Electrical Sector (Cutler-Hammer)
   2. General Electric Company
   3. Siemens Industry, Inc.
   4. Square D
   5. Substitutions: Section 012513 – Substitution Procedures.

B. Description: NEMA PB 1, circuit breaker type panelboard.

C. Materials

1. Panelboard Bus: Copper, current carrying components, ratings as indicated on Drawings. Furnish copper ground bus in each panelboard.
2. Molded Case Circuit Breakers: UL 489, circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Furnish circuit breakers UL listed as Type HACR for heating and air conditioning equipment branch circuits.
3. Circuit Breaker Accessories: Trip units and auxiliary switches as indicated on Drawings.
4. Surge Suppressers: Integrated in panelboard.
5. Enclosure: NEMA PB 1, Type 1, 6 inches deep, 20 inches wide, cabinet box.
6. Cabinet Front: Surface type, fastened with concealed trim clamps or screws, hinged door with flush lock.

D. Finishes

1. Manufacturer's standard gray enamel.

2.02 SOURCE QUALITY CONTROL

A. Section 014000 - Quality Requirements: Testing, inspection and analysis requirements.

B. Independently test integral surge suppressers with category C3 high exposure waveform (20 kV-1.2/50us, 10kA-8/20 us) per IEEE C62.41.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install panelboards in accordance with NEMA PB 1.1.

B. Install panelboards plumb.

C. Height: 6 feet to top of panelboard; install panelboards taller than 6 feet with bottom no more than 4 inches above floor.

D. Install filler plates for unused spaces in panelboards.

E. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes to balance phase loads. Identify each circuit as to its clear, evident and specific purpose of use.

F. Install engraved plastic nameplates in accordance with Section 260553 – Identification for Electrical Systems.

G. Ground and bond panelboard enclosure according to Section 260526 – Grounding and Bonding for Electrical Systems. Connect equipment ground bars of panels in accordance with NFPA 70.

3.02 REPAIR

A. Repair existing panelboards to remain.

3.03 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for inspecting, testing.

B. Section 017000 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.

C. Inspect and test in accordance with NETA ATS, except Section 4.

D. Perform circuit breaker inspections and tests listed in NETA ATS, Section 7.6.

E. Perform switch inspections and tests listed in NETA ATS, Section 7.5.

F. Perform controller inspections and tests listed in NETA ATS, Section 7.16.1.

3.04 ADJUSTING

A. Section 017000 - Execution and Closeout Requirements: Requirements for starting and adjusting.

B. Measure steady state load currents at each panelboard feeder; rearrange circuits in panelboard to balance phase loads to within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits.

3.05 CLEANING

A. Section 017000 - Execution and Closeout Requirements: Requirements for cleaning.

B. Clean existing panelboards to remain or to be reinstalled.

END OF SECTION

SECTION 262716

ELECTRICAL CABINETS AND ENCLOSURES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Hinged cover enclosures.
   2. Cabinets.
   3. Terminal blocks.
   4. Accessories.

B. Related Requirements:
   1. Section 260526 - Grounding and Bonding for Electrical Systems.
   2. Section 260529 - Hangers and Supports for Electrical Systems.
   3. Section 260533 - Raceway and Boxes for Electrical Systems.

1.02 REFERENCE STANDARDS

A. National Electrical Manufacturers Association:
   1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
   2. NEMA ICS 4 - Industrial Control and Systems: Terminal Blocks.

1.03 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Submittal procedures.

B. Product Data: Submit manufacturer's standard data for enclosures, cabinets, and terminal blocks.

C. Manufacturer's Instructions: Submit application conditions and limitations of use stipulated by product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

D. Qualification Statements:
   1. Submit fabricator, experience qualifications.

1.04 MAINTENANCE MATERIAL SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance materials.

B. Extra Stock Materials:
   1. Furnish two of each key.

1.05 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years experience.

PART 2 - PRODUCTS

2.01 HINGED COVER ENCLOSURES

A. Manufacturers:
   1. Rittal
   2. Adalet
   3. Hoffman
   4. Substitutions: Section 012513 – Substitution Procedures.

B. Description: NEMA 250, Type 1 steel enclosure.
   1. Covers: Continuous hinge.
   2. Furnish interior metal panel for mounting terminal blocks and electrical components; finish with white enamel.
   3. Enclosure Finish: Manufacturer's standard enamel.

2.02 CABINETS

A. Manufacturers:
   1. Rittal
   2. Hammon Mfg. Co., Inc
   3. Hoffman
   4. Substitutions: Section 012513 – Substitution Procedures.

B. Description:
   1. Boxes: Galvanized steel.
   2. Box Size: as required.
   3. Backboard: Furnish backboard for mounting terminal blocks. Paint matte white.
   4. Fronts: Steel, surface type with concealed trim clamps, door with concealed hinge, and flush lock.

C. Fabrication
   1. Furnish metal barriers to form separate compartments wiring of different systems and voltages.
   2. Furnish accessory feet for free-standing equipment.

D. Finishes:
   1. Finish with gray baked enamel.

2.03 TERMINAL BLOCKS

A. Manufacturers:
   1. Pheonix Contact
   2. Allen-Bradley/Rockwell
   3. Cooper Bussmann
   4. Square D
   5. Substitutions: Section 012513 – Substitution Procedures.

B. Description:
   1. Terminal Blocks: NEMA ICS 4.
   2. Power Terminals: Unit construction type with closed back and tubular pressure screw connectors, rated 600 volts.
   3. Signal and Control Terminals: Modular construction type, suitable for channel mounting, with tubular pressure screw connectors, rated 300 volts.
   4. Furnish ground bus terminal block, with each connector bonded to enclosure.

2.04 PLASTIC RACEWAY

A. Manufacturers:
   1. Panduit Corp.
   2. Wiremold/Legrand
   3. Substitutions: Section 012513 – Substitution Procedures.

B. Description: Plastic channel with hinged or snap-on cover.

PART 3 - EXECUTION

3.01 REPAIR

A. Repair existing cabinets and enclosures to remain.

3.02 INSTALLATION

A. Install enclosures and boxes plumb. Anchor securely to wall and structural supports at each corner in accordance with Section 260529 – Hangers and Supports for Electrical Systems.

B. Install cabinet fronts plumb.

3.03 CLEANING

A. Section 017000 - Execution and Closeout Requirements: Final cleaning.

B. Clean existing cabinets and enclosures to remain or to be reinstalled.

C. Clean electrical parts to remove conductive and harmful materials.

D. Remove dirt and debris from enclosure.

E. Clean finishes and touch up damage.

END OF SECTION

SECTION 262726

WIRING DEVICES

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes wall switches; receptacles; and device plates and box covers.

B. Related Sections:
1. Section 260533 - Raceway and Boxes for Electrical Systems: Outlet boxes for wiring devices.

1.02 REFERENCES

A. National Electrical Manufacturers Association:
1. NEMA WD 1 - General Requirements for Wiring Devices.
2. NEMA WD 6 - Wiring Devices-Dimensional Requirements.

1.03 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Submittal procedures.

B. Product Data: Submit manufacturer's catalog information showing dimensions, colors, and configurations.

1.04 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

1.05 EXTRA MATERIALS

A. Section 017000 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Furnish two of each style, size, and finish wall plate.

PART 2 - PRODUCTS

2.01 WALL SWITCHES

A. Manufacturers; Wall Switches:
1. Cooper Wiring Devices, Inc.
2. Leviton Manufacturing Co.
3. Pass Seymour/Legrand
4. Substitutions: Section 012513 – Substitution Procedures.

B. Product Description: NEMA WD 1, Heavy-Duty, AC only general-use snap switch.

C. Body and Handle: Grey plastic with toggle handle.

D. Ratings:
1. Voltage: 120-277 volts, AC.
2. Current: 20 amperes.

2.02 RECEPTACLES

A. Manufacturers:
1. Cooper Wiring Devices, Inc.
2. Leviton Manufacturing Co.
3. Substitutions: Section 012513 – Substitution Procedures.

B. Product Description: NEMA WD 1, Heavy-duty general use receptacle.

C. Device Body: grey plastic.

D. Configuration: NEMA WD 6, type as indicated on Drawings.

E. Convenience Receptacle: Type 5-20.

F. GFCI Receptacle: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements.

2.03 WALL PLATES

A. Manufacturers:
1. Cooper
2. EGS/Appleton Electric
3. Leviton Manufacturing Co.
4. Lutron Electronics Co., Inc.
5. RACO; Hubbell
6. Substitutions: Section 012513 – Substitution Procedures.

B. Decorative Cover Plate: 302 stainless steel.

C. Weatherproof Cover Plate: Gasketed cast metal plate with hinged and gasketed in-use device cover.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Section 013113 – Project Coordination: Coordination and project conditions.

B. Verify outlet boxes are installed at proper height.

C. Verify branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.02 PREPARATION

A. Clean debris from outlet boxes.

3.03 EXISTING WORK

A. Disconnect and remove abandoned wiring devices.

B. Modify installation to maintain access to existing wiring devices to remain active.

C. Clean and repair existing wiring devices to remain or to be reinstalled.

3.04 INSTALLATION

A. Install devices plumb and level.

B. Install switches with OFF position down.

C. Install receptacles with grounding pole on top.

D. Connect wiring device grounding terminal to outlet box with bonding jumper and branch circuit equipment grounding conductor.

E. Install wall plates on switches, receptacles, and blank outlets.

F. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

3.05 INTERFACE WITH OTHER PRODUCTS

A. Install wall switch 48 inches above finished floor.

B. Install convenience receptacle 18 inches above finished floor.

3.06 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements and 017000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Inspect each wiring device for defects.

C. Operate each wall switch with circuit energized and verify proper operation.

D. Verify each receptacle device is energized.

E. Test each receptacle device for proper polarity.

F. Test each GFCI receptacle device for proper operation.

3.07 ADJUSTING

A. Section 017000 - Execution and Closeout Requirements: Testing, adjusting, and balancing.

B. Adjust devices and wall plates to be flush and level.

3.08 CLEANING

A. Section 017000 - Execution and Closeout Requirements: Final cleaning.

B. Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION

SECTION 262813

FUSES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Fuses.

1.02 REFERENCE STANDARDS

A. National Electrical Manufacturers Association:
   1. NEMA FU 1 - Low Voltage Cartridge Fuses.

1.03 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Submittal procedures.

B. Product Data: Submit data sheets showing electrical characteristics, including time-current curves.

1.04 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Record actual sizes, ratings, and locations of fuses.

1.05 MAINTENANCE MATERIALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance materials

B. Spare Parts:
   1. Furnish two fuse pullers.

C. Extra Materials:
   1. Furnish three spare fuses of each Class, size, and rating installed.

1.06 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers:
   1. Bussman
   2. Eaton/Cooper
   3. Littelfuse
   4. Substitutions: Section 012513 – Substitution Procedures.

2.02 FUES PERFORMANCE REQUIREMENTS

A. Main Service Switches: Class J (time delay).

B. Power Load Feeder Switches: Class J (time delay).

C. Motor Load Feeder Switches: Class J (time delay).

D. Motor Branch Circuits: Class J (time delay).

2.03 FUSES

A. Dimensions and Performance: NEMA FU 1, Class as specified or as indicated on Drawings.

B. Voltage: Rating suitable for circuit phase-to-phase voltage.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install fuse with label oriented so manufacturer, type, and size are easily read.

END OF SECTION

SECTION 262819

ENCLOSED SWITCHES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Fusible.
   2. Nonfusible switches.

B. Related Requirements:
   1. Section 260529 - Hangers and Supports for Electrical Systems.
   2. Section 260553 - Identification for Electrical Systems.
   3. Section 262813 - Fuses.

1.02 REFERENCE STANDARDS

A. National Electrical Manufacturers Association:
   1. NEMA FU 1 - Low Voltage Cartridge Fuses.
   2. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).

B. International Electrical Testing Association:
   1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

1.03 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Submittal procedures.

B. Product Data: Submit switch ratings and enclosure dimensions.

1.04 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Record actual locations of enclosed switches and ratings of installed fuses.

1.05 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

PART 2 - PRODUCTS

2.01 FUSIBLE SWITCH ASSEMBLIES

A. Manufacturers:
   1. General Electric Company
   2. Cutler-Hammer
   3. Siemens Power Transmission
   4. Square D
   5. Substitutions: Section 012513 -Substitution Procedures.

B. Description: NEMA KS 1, Type HD GD with externally operable handle interlocked to prevent opening front cover with switch in ON position, enclosed load interrupter knife switch. Handle lockable in OFF position.

C. Operation:
   1. Switch Ratings
      a. Switch Rating: Horsepower rated for AC or DC as indicated on Drawings.
      b. Short Circuit Current Rating: UL listed for 200,000 rms symmetrical amperes when used with or protected by Class R or Class J fuses (30-600 ampere switches employing appropriate fuse rejection schemes). 200,000 rms symmetrical amperes when used with or protected by Class L fuses (800-1200 ampere).

D. Materials:
   1. Fuse clips: Designed to accommodate NEMA FU 1, Class J fuses.
   2. Enclosure: NEMA KS 1, to meet conditions. Fabricate enclosure from steel finished with manufacturer's standard gray enamel.
      a. Interior Dry Locations: Type 1.
      b. Exterior Locations: Type 3R.
   3. Service Entrance: Switches identified for use as service equipment are to be labeled for this application. Furnish solid neutral assembly and equipment ground bar.

2.02 NONFUSIBLE SWITCH ASSEMBLIES

A. Manufacturers:
   1. General Electric Company
   2. Eaton Electrical Sector
   3. Siemens Power Transmission
   4. Square D
   5. Substitutions: Section 012513 – Substitution Procedures.

B. Description: NEMA KS 1, Type HD ,GD with externally operable handle interlocked to prevent opening front cover with switch in ON position enclosed load interrupter knife switch. Handle lockable in OFF position.

C. Operation:
1. Switch Ratings
a. Switch Rating: Horsepower rated for AC or DC as indicated on Drawings.
b. Short Circuit Current Rating: UL listed for 200,000 rms symmetrical amperes when used with or protected by Class R or Class J fuses (30-600 ampere switches employing appropriate fuse rejection schemes). 200,000 rms symmetrical amperes when used with or protected by Class L fuses (800-1200 ampere).

D. Materials:
1. Enclosure: NEMA KS 1, to meet conditions. Fabricate enclosure from steel finished with manufacturer's standard gray enamel.
a. Interior Dry Locations: Type 1.
b. Exterior Locations: Type 3R.
2. Service Entrance: Switches identified for use as service equipment are to be labeled for this application. Furnish solid neutral assembly and equipment ground bar.

2.03 NONFUSIBLE DOUBLE THROW SWITCH ASSEMBLIES

A. Manufacturers:
1. General Electric Company
2. Eaton Electrical Sector
3. Siemens Power Transmission
4. Square D
5. Substitutions: Section 012513 – Substitutions.

B. Description: NEMA KS 1, Type HD, GD with externally operable handle interlocked to prevent opening front cover with switch in either ON position enclosed load interrupter knife switch. Handle lockable in Load 1, Load 2 and OFF position.

C. Switch configured to switch one power source between two loads.

D. Cam locks, provide four (4) 400A, 600 V Cam lock receptacles connected to load 2, and wired out bottom of panel.

E. Operation:
1. Switch Ratings
a. Switch Rating: 400 A, 4 pole.
b. Short Circuit Current Rating: UL listed for 200,000 rms symmetrical amperes when used with or protected by Class R or Class J fuses (30-600 ampere switches employing appropriate fuse rejection schemes).

F. Material:
1. Enclosure: NEMA KS 1, to meet conditions. Fabricate enclosure from steel finished with manufacturer's standard gray enamel.
a. Interior Dry Locations: Type 1.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install enclosed switches where indicated.

B. Install enclosed switches plumb. Provide supports in accordance with Section 260529 – Hangers and Supports for Electrical Systems.

C. Height: 5 feet to operating handle.

D. Install fuses for fusible disconnect switches. Refer to Section 262813 - Fuses for product requirements.

E. Install engraved plastic nameplates in accordance with Section 260553 – Identification for Electrical Systems. Engrave nameplates with the equipment served and the panel and circuit number supplying the switch.

F. Apply adhesive tag on inside door of each fused switch indicating NEMA fuse class and size installed.

3.02 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for inspecting, testing, adjusting, and balancing.

B. Section 017000 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.

C. Inspect and test in accordance with NETA ATS, except Section 4.

D. Perform inspections and tests listed in NETA ATS, Section 7.5.

3.03 CLEANING

A. Section 017000 - Execution and Closeout Requirements: Requirements for cleaning.

B. Clean existing enclosed switches to remain or to be reinstalled.

END OF SECTION

SECTION 262826

ENCLOSED TRANSFER SWITCHES

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes transfer switches in individual enclosures.

B. Related Sections:
1. Section 033000 - Cast-In-Place Concrete for concrete pads.
2. Section 260526 - Grounding and Bonding for Electrical Systems.
3. Section 260529 - Hangers and Supports for Electrical Systems.
4. Section 260553 - Identification for Electrical Systems.
5. Section 263213 - Engine Generators for testing requirements.

1.02 REFERENCES

A. National Electrical Manufacturers Association:
1. NEMA ICS 10 - Industrial Control and Systems: AC Transfer Switch Equipment.

B. International Electrical Testing Association:
1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

C. Underwriters Laboratories Inc.:
1. UL 1008 - Transfer Switch Equipment.

1.03 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit catalog sheets showing voltage, switch size, ratings and size of switching and overcurrent protective devices, operating logic, short circuit ratings, dimensions, and enclosure details.

1.04 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Record actual locations of enclosed transfer switches.

C. Operation and Maintenance Data: Submit routine preventative maintenance and lubrication schedule. List special tools, maintenance materials, and replacement parts.

1.05 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience ,and with service facilities within 100 miles of Project.

B. Supplier: Authorized distributor of specified manufacturer with minimum three years experience.

1.06 MAINTENANCE SERVICE

A. Section 017000 - Execution and Closeout Requirements: Maintenance service.

B. Furnish service and maintenance of transfer switches for one year from Date of Substantial Completion.

PART 2 - PRODUCTS

2.01 AUTOMATIC TRANSFER SWITCH

A. Manufacturers:
   1. ASCO Power Technologies, Series 4000
   2. Substitutions: Not Allowed.

B. Product Description: NEMA ICS 10, automatic transfer switch.

C. Configuration: Electrically operated, mechanically held transfer switch.

D. Rating: 480Y/277 Volt, 400 AMP, 4 Pole.

E. Interrupting Capacity: 100 percent of continuous rating.

F. Withstand Current Rating: 100 rms symmetrical amperes, when used with Class J current limiting fuse or molded case circuit breaker.

G. Product Features:
   1. Indicating Lights: Mount in cover of enclosure to indicate NORMAL SOURCE AVAILABLE, ALTERNATE SOURCE AVAILABLE, switch position.
   2. Test Switch: Mount in cover of enclosure to simulate failure of normal source.
   3. Return to Normal Switch: Mount in cover of enclosure to initiate manual transfer from alternate source to normal source.
   4. Transfer Switch Auxiliary Contacts: 2 normally open; 2 normally closed.
   5. Normal Source Monitor: Monitor each line of normal source voltage and frequency; initiate transfer when voltage drops below 85 percent or frequency varies more than 3 Hertz from rated nominal value.

6. Alternate Source Monitor: Monitor alternate source voltage and frequency; inhibit transfer when voltage is below 85 percent or frequency varies more than 3 Hertz from rated nominal value.
7. Switched Neutral: Non-Overlapping contacts.

H. Automatic Sequence of Operation:
1. Initiate Time Delay to Start Alternate Source Engine Generator: Upon initiation by normal source monitor.
2. Time Delay To Start Alternate Source Engine Generator: 0 to 6 seconds, adjustable.
3. Initiate Transfer Load to Alternate Source: Upon initiation by normal source monitor and permission by alternate source monitor.
4. Time Delay Before Transfer to Alternate Power Source: 0 to 60 minutes, adjustable.
5. Initiate Retransfer Load to Normal Source: programmed for manual re-transfer from generator source to utility source.
6. Time Delay Before Engine Shut Down: 0 to 60 minutes, adjustable, of unloaded operation.
7. Engine Exerciser: Start engine every 7 days; run for 15 minutes before shutting down. Bypass exerciser control when normal source fails during exercising period.

I. Enclosure:
1. Enclosure: ICS 10, Type 1.
2. Floor mounted.
3. Finish: Manufacturer's standard gray enamel.

J. ATS shall be capable of Modbus TCP/IP Communication with ECWA RTU via Cat 6 Cable.

2.02 SOURCE QUALITY CONTROL

A. Furnish shop inspection and testing of each transfer switch.

B. Make completed transfer switch available for inspection at manufacturer’s factory prior to packaging for shipment. Notify Owner at least seven days before inspection is allowed.

C. Allow witnessing of factory inspections and tests at manufacturer’s test facility. Notify Owner at least seven days before inspections and tests are scheduled.

PART 3 - EXECUTION

3.01 EXISTING WORK

A. Clean and repair existing transfer switch to remain.

3.02 INSTALLATION

A. Install housekeeping pads in accordance with Section 033000 – Cast-in Place Concrete.

B. Install engraved plastic nameplates in accordance with Section 260553.

3.03 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements and 017000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Perform inspections and tests listed in NETA ATS, Section 7.22.3.

3.04 MANUFACTURER'S FIELD SERVICES

A. Section 014000 - Quality Requirements: Manufacturers' field services.

B. Check out transfer switch connections and operations and place in service.

3.05 ADJUSTING

A. Section 017000 - Execution and Closeout Requirements: Testing, adjusting, and balancing.

B. Adjust control and sensing devices to achieve specified sequence of operation.

3.06 DEMONSTRATION AND TRAINING

A. Demonstrate operation of transfer switch in normal, and emergency modes.

END OF SECTION

SECTION 262923

VARIABLE-FREQUENCY MOTOR CONTROLLERS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes variable frequency controllers.

B. Related Sections:
   1. Section 262813 - Fuses.

1.02 REFERENCES

A. Institute of Electrical and Electronics Engineers:
   1. IEEE C62.41 - Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits.

B. National Electrical Manufacturers Association:
   1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
   2. NEMA FU 1 - Low Voltage Cartridge Fuses.
   3. NEMA ICS 7 - Industrial Control and Systems: Adjustable Speed Drives.
   4. NEMA ICS 7.1 - Safety Standards for Construction and Guide for Selection, Installation, and Operation of Adjustable Speed Drive Systems.

C. International Electrical Testing Association:
   1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

1.03 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Submittal procedures.

B. Shop Drawings: Indicate front and side views of enclosures with overall dimensions and weights shown; conduit entrance locations and requirements; and nameplate legends.

C. Product Data: Submit catalog sheets showing voltage, controller size, ratings and size of switching and overcurrent protective devices, short circuit ratings, dimensions, and enclosure details.

D. Test Reports: Indicate field test and inspection procedures and test results.

E. Manufacturer's Field Reports: Indicate start-up inspection findings.

1.04 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.

B. Operation and Maintenance Data: Submit instructions complying with NEMA ICS 7.1. Include procedures for starting and operating controllers, and describe operating limits possibly resulting in hazardous or unsafe conditions. Include routine preventive maintenance schedule.

1.05 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience,and with service facilities within 100 miles of project.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Section 016500 – Transportation and Handling of Materials and Equipment: Requirements for transporting and handling products.

B. Section 016600 – Storage of Material: Requirements for storing and protecting products.

C. Store in clean, dry space. Maintain factory wrapping or provide additional canvas or plastic cover to protect units from dirt, water, construction debris, and traffic.

D. Handle in accordance with manufacturer's written instructions. Lift only with lugs provided. Handle carefully to avoid damage to components, enclosure, and finish.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Section 016500 – Transportation and Handling of Materials and Equipment: Requirements for transporting and handling products.

B. Section 016600 – Storage of Material: Requirements for storing and protecting products.

C. Conform to NEMA ICS 7 service conditions during and after installation of variable frequency controllers.

1.08 WARRANTY

A. Section 017000 - Execution and Closeout Requirements: Product warranties and product bonds.

B. Furnish two year manufacturer warranty for variable frequency controller.

1.09 MAINTENANCE SERVICE

A. Section 017000 - Execution and Closeout Requirements: Maintenance service.

B. Furnish service and maintenance of variable frequency controller for one year from Date of Substantial Completion.

1.10 MAINTENANCE MATERIALS

A. Section 017000 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Furnish two of each air filter.

PART 2 - PRODUCTS

2.01 VARIABLE FREQUENCY DRIVE CABINET

A. Manufacturers:
   1. Schneider Electric
   2. Substitutions: None

B. Product Description
   1. The variable frequency drive cabinet shall be in accordance with ECWA Pump VFD Controller Diagrams, refer to Appendix E.
   2. All equipment shall be mounted in a Hoffman Disconnect Enclosure. Enclosure shall be floor mounted cabinet 90” x 40” x 24, per Appendix E.
   3. Cabinet shall have door mounted VFD graphic keypad, proface HMI, E-Stop, ethernet bulkhead connector, disconnect switch handle, door handle and two filter grill panels, per Appendix E.
   4. Cabinet shall have a fixed backplate. The following devices shall be mounted on the backplate: main circuit breaker, control transformer, VFD, contactor line reactor, and ground lug, per Appendix E.
   5. Cabinet shall have a swing out backplate with the following devices: all control devices, PLC, terminal strips, fuses, etc. per Appendix E.

2.02 VARIABLE FREQUENCY CONTROLLER

A. Manufacturers:
   1. Schneider Electric Altivar 630.
   2. Substitutions: None.

B. Product Description: NEMA ICS 7, enclosed variable frequency controller suitable for operating indicated loads. Select unspecified features and options in accordance with NEMA ICS 7.1.

C. Ratings:
   1. Rated Input Voltage: 480 volts, three phase, 60 Hertz.
   2. Motor Nameplate Voltage: 460 volts, three phase, 60 Hertz.

3. Displacement Power Factor: Between 1.0 and 0.95, lagging, over entire range of operating speed and load.
4. Operating Ambient: 0 degrees C to 40 degrees C.

D. Design Features:
1. Employ microprocessor-based inverter logic isolated from power circuits.
2. Employ pulse-width-modulated inverter system.
3. Design for ability to operate controller with motor disconnected from output.
4. Design to attempt five automatic restarts following fault condition before locking out and requiring manual restart.

E. Indicators and Manual Controls:
1. VFD controls shall be in accordance with ECWA Pump VFD Controller Diagrams, refer to Appendix E.

F. Safeties and Interlocks:
1. Safeties and interlocks shall be in accordance with ECWA Pump VFD Controller Diagrams, refer to Appendix E

G. Fabrication:
1. Wiring Terminations: Match conductor materials and sizes as indicated on Drawings.
2. Enclosure: NEMA 250, Type 1, suitable for equipment application in places accessible only to qualified personnel.
3. Finish: Manufacturer's standard enamel.

H. Accessories:
1. Include Modbus TCP/IP communications module.

2.03 SOURCE QUALITY CONTROL

A. Shop inspect and perform standard productions tests for each controller.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Section 013113 – Project Coordination: Coordination and project conditions.

B. Verify building environment is maintained within service conditions required by manufacturer.

3.02 INSTALLATION

A. Install in accordance with NEMA ICS 7.1.

B. Tighten accessible connections and mechanical fasteners after placing controller.

C. Install fuses in fusible switches.

D. Select and install overload heater elements in motor controllers to match installed motor characteristics.

E. Install engraved plastic nameplates in accordance with Section 260553 – Identification for Electrical Systems.

F. Neatly type label inside controller door identifying motor served, nameplate horsepower, full load amperes, code letter, service factor, and voltage/phase rating. Place label in clear plastic holder.

G. Ground and bond controller in accordance with Section 260526 – Grounding and Bonding for Electrical Systems.

3.03 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements and 017000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Perform inspections and tests listed in NETA ATS, Section 7.16 and NEMA ICS 7.1.

3.04 MANUFACTURER'S FIELD SERVICES

A. VFD units shall be programmed and tested by ECWA in fabricators shop prior to shipment.

B. Section 014000 - Quality Requirements: Manufacturer’s field services.

C. Prepare and startup variable frequency controller.

3.05 DEMONSTRATION AND TRAINING

A. Not required.

END OF SECTION

SECTION 263213

ENGINE GENERATORS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes engine generator set, exhaust silencer and fittings, fuel fittings and day tank, remote control panel, battery, and charger.

B. Related Sections:
1. Section 260526 - Grounding and Bonding for Electrical Systems.
2. Section 260553 - Identification for Electrical Systems.
3. Section 262826 - Enclosed Transfer Switches.

1.02 REFERENCES

A. National Electrical Manufacturers Association:
1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
2. NEMA ICS 10 - Industrial Control and Systems: AC Transfer Switch Equipment.
3. NEMA MG 1 - Motors and Generators.

B. International Electrical Testing Association:
1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

C. National Fire Protection Association:
1. NFPA 30 - Flammable and Combustible Liquids Code.
2. NFPA 110 - Standard for Emergency and Standby Power Systems.

D. Underwriters Laboratories Inc.:
1. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures.

1.03 SYSTEM DESCRIPTION

A. Description: Engine generator assembly and accessories to provide source of power for Level 1 and 2 applications in accordance with NFPA 110.

B. Capacity: 125 kW, 156 kVA at elevation of 750 feet above sea level, standby rating using specified engine cooling scheme.

1.04 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Submittal procedures.

B. Shop Drawings: Indicate electrical characteristics and connection requirements. Include plan and elevation views with overall and interconnection point dimensions, fuel consumption rate curves at various loads, ventilation and combustion air requirements, electrical diagrams including schematic and interconnection diagrams.

C. Product Data: Submit data showing dimensions, weights, ratings, interconnection points, and internal wiring diagrams for engine, generator, control panel, battery, battery rack, battery charger, exhaust silencer, vibration isolators, and day tank.

D. Test Reports: Indicate results of performance testing.

E. Manufacturer's Field Reports: Indicate inspections, findings, and recommendations.

1.05 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.

B. Operation and Maintenance Data: Submit instructions and service manuals for normal operation, routine maintenance, oil sampling and analysis for engine wear, and emergency maintenance procedures.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience,and with service facilities within 100 miles of project.

B. Supplier: Authorized distributor of specified manufacturer with minimum three years experience.

1.07 WARRANTY

A. Section 017000 - Execution and Closeout Requirements: Product warranties and product bonds.

B. Furnish two year manufacturer warranty.

1.08 DELIVERY, STORAGE AND HANDLING

A. Section 016500 – Transportation and Handling of Materials and Equipment: Requirements for transporting and handling products.

B. Section 016600 – Product Requirements: Requirements for storing and protecting products.

1.09 MAINTENANCE SERVICE

A. Section 017000 - Execution and Closeout Requirements: Maintenance service.

B. Furnish service and maintenance of engine generator for two years from Date of Substantial Completion.

1.10 MAINTENANCE MATERIALS

A. Section 017000 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Furnish one set of tools required for preventative maintenance of engine generator system. Package tools in adequately sized metal tool box.

C. Furnish two of each fuel, oil and air filter element.

PART 2 - PRODUCTS

2.01 GENERATOR PACKAGE

A. Manufacturers:
   1. MTU On-site energy Corp.
   2. Substitutions: Section 012513 – Substitutions.

2.02 ENGINE

A. Manufacturers:
   1. John Deere
   2. Mercedes
   3. Substitutions: Section 012513 – Substitution Procedures.

B. Product Description: Air-cooled in-line or V-type, four-stroke cycle, compression ignition Diesel electric ignition internal combustion engine.

C. Rating: Sufficient to operate under 10 percent overload for one hour in ambient of 90 degrees F at elevation of 1500 feet

D. Fuel System: No. 2 fuel oil.

E. Engine speed: 1800 rpm.

F. Safety Devices: Engine shutdown on high water temperature, low oil pressure, overspeed, and engine overcrank. Limits as selected by manufacturer.

G. Engine Starting: DC starting system with positive engagement, number and voltage of starter motors in accordance with manufacturer's instructions. Furnish remote starting control circuit, with MANUAL-OFF-REMOTE selector switch on engine-generator control panel.

H. Engine Jacket Heater: Thermal circulation type water heater with integral thermostatic control, sized to maintain engine jacket water at 90 degrees F, and suitable for operation on 120 volts AC.

I. Radiator: Radiator using glycol coolant, with blower type fan, sized to maintain safe engine temperature in ambient temperature of 110 degrees F Radiator air flow restriction 0.5 inches of water maximum.

J. Engine Accessories: Fuel filter, lube oil filter, intake air filter, lube oil cooler, fuel transfer pump, fuel priming pump, gear-driven water pump. Furnish fuel pressure gage, water temperature gage, and lube oil pressure gage on engine/generator control panel.

K. Mounting: Furnish unit with suitable spring-type vibration isolators and mount on structural steel base.

2.03 GENERATOR

A. Manufacturers:
   1. Marathon
   2. Substitutions: Section 012513 – Substitution Procedures.

B. Product Description: NEMA MG1, three phase, four pole, reconnectable brushless synchronous generator with brushless exciter.

C. Rating: 125 kW, 156 kVA, at 0.8 power factor, 480Y/277 volts, 60 Hz at 1800 rpm.

D. Insulation Class: F.

E. Temperature Rise: 130 degrees C Standby.

F. Enclosure: NEMA MG1, open drip proof.

G. Voltage Regulation: Furnish generator mounted volts per hertz exciter-regulator to match engine and generator characteristics, with voltage regulation plus or minus 1 percent from no load to full load. Furnish manual controls to adjust voltage droop, voltage level (plus or minus 5 percent) and voltage gain.

2.04 GOVERNOR

A. Product Description: Electronic Isochronous governor to maintain engine speed within 0.5 percent, steady state, and 5 percent, no load to full load, with recovery to steady state within 2 seconds following sudden load changes.

2.05 ACCESSORIES

A. Skid-Mounted Fuel Tank: 24 hour continuous full load operation subbase, double wall, steel tank, with leak detection, fill and vent, fuel gage, and fuel level sensor manufactured per UL 142.

B. Exhaust Silencer: Critical type silencer, with muffler companion flanges and flexible stainless steel exhaust fitting, sized in accordance with engine manufacturer's instructions mounted inside enclosure.

C. Batteries: Heavy duty, diesel starting type sealed lead-acid storage batteries. Match battery voltage to starting system. Furnish cables and clamps.

D. Battery Tray: Treated for electrolyte resistance, constructed to contain spillage.

E. Battery Heater: 120 VAC plug-in type.

F. Battery Charger: Current limiting type designed to float at 2.17 volts for each cell and equalize at 2.33 volts for each cell. Furnish overload protection, full wave rectifier, DC voltmeter and ammeter, and 120 volts AC fused input. Furnish wall mounted enclosure to meet NEMA 250, Type 1 requirements mounted inside enclosure.

G. Line Circuit Breaker: UL 489, molded case circuit breaker on generator output with integral thermal and instantaneous magnetic trip in each pole. Furnish battery voltage operated shunt trip, connected to open circuit breaker on engine failure. Unit mount in enclosure to meet NEMA 250, Type 1 requirements.

H. Engine-Generator Control Panel: NEMA 250, Type 1 generator-mounted control panel enclosure with engine and generator controls and indicators. Furnish provision for padlock and the following equipment and features:
   1. Controller shall have Modbus TCP/IP communication with ECWA RTU via Cat 6 Cable.
   2. Controller shall have non-proprietary software available to download free of charge.
   3. Frequency Meter: 45-65 Hz. range, 3.5 inch dial.
   4. AC Output Voltmeter: 3.5 inch dial, 2 percent accuracy, with phase selector switch.
   5. AC Output Ammeter: 3.5 inch dial, 2 percent accuracy, with phase selector switch.
   6. Output voltage adjustment.
   7. Push-to-test indicator lamps, one each for low oil pressure, high water temperature, overspeed, and overcrank.
   8. Engine start/stop selector switch.
   9. Engine running time meter.
   10. Oil pressure gage.
   11. Water temperature gage.

12. Auxiliary Relay: 3PDT, operates when engine runs, with contact terminals prewired to terminal strip.
13. Additional visual indicators and alarms in accordance with by NFPA 110.
14. Remote Alarm Contacts: Factory wire SPDT contacts to Modbus TCP/IP for remote alarm functions in accordance with NFPA 110.
15. A digital control panel shall be acceptable in lieu of analog meters.

I. Weather-protective Enclosure: Reinforced steel housing allowing access to control panel and service points, with lockable doors and panels. Furnish fixed louvers, battery rack, and silencer.

2.06 SOURCE QUALITY CONTROL

A. Provide shop inspection and testing of completed assembly.

B. Make completed engine-generator assembly available for inspection at manufacturer's factory prior to packaging for shipment. Notify Owner/Engineer at least seven days before inspection is allowed.

C. Allow witnessing of factory inspections and tests at manufacturer's test facility. Notify Owner/Engineer at least seven days before inspections and tests are scheduled.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install engraved plastic nameplates in accordance with Section 260553 – Identification for Electrical Systems.

B. Ground and bond generator and other electrical system components in accordance with Section 260526 – Grounding and Bonding for Electrical Systems.

3.02 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements and 017000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Perform inspections and tests listed in NETA ATS, Section 7.22.

3.03 MANUFACTURER'S FIELD SERVICES

A. Section 014000 - Quality Requirements: Manufacturer's field services.

B. Prepare and start up engine-generator assembly.

3.04 ADJUSTING

A. Section 017000 - Execution and Closeout Requirements: Testing, adjusting, and balancing.

B. Adjust generator output voltage and engine speed to meet specified ratings.

3.05 CLEANING

A. Section 017000 - Execution and Closeout Requirements: Final cleaning.

B. Clean engine and generator surfaces. Replace oil and fuel filters with new.

3.06 DEMONSTRATION AND TRAINING

A. Furnish four (4) hours of instruction each for four (4) persons, to be conducted at project site with manufacturer's representative.

B. Describe loads connected to standby system and restrictions for future load additions.

C. Simulate power outage by interrupting normal source, and demonstrate system operates to provide standby power.

END OF SECTION

SECTION 265100

INTERIOR LIGHTING

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes interior luminaires, lamps, ballasts, and accessories.

B. Related Sections:
   1. Section 260526 - Grounding and Bonding for Electrical Systems.
   2. Section 260533 - Raceway and Boxes for Electrical Systems.

1.02 REFERENCES

A. American National Standards Institute:
   1. C78.377-2011 (or latest), American National Standard for the Chromaticity of Solid State Lighting Products.
   2. C82.77-2002 (or latest), American National Standard for Harmonic Emission Limits - Related Power Quality Requirements for Lighting Equipment.
   3. Tested to IESNA LM-79-08 Testing Standards.
   4. NRTL Listed for Damp Location.

B. ENERGY STAR®
   1. ENERGY STAR TM-21 Calculator, rev. 020712 (or latest, www.energystar.gov/TM-21Calculator)

C. Federal Communications Commission (FCC)
   1. 47 CFR Part 15, Telecommunication – Radio Frequency Devices

D. Federal Trade Commission (FTC)
   1. Complying with the Made in USA Standard, December 1998 (http://business.ftc.gov/advertising-and-marketing/made-usa)
   2. Green Guides, 16 CFR Part 260, Guides for the Use of Environmental Marketing Claims

E. Illuminating Engineering Society of North America (IESNA or IES)
   1. LM-63-02 (R2008 or latest), ANSI/IESNA Standard File Format for the Electronic Transfer of Photometric Data and Related Information
   2. LM-79-08 (or latest), IESNA Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products
   3. LM-80-08 (or latest), IESNA Approved Method for Measuring Lumen Maintenance of LED Light Sources
   4. TM-21-11 (or latest), Projecting Long Term Lumen Maintenance of LED Light Sources

F. International Electrotechnical Commission (IEC)
   1. 60929 Annex E, Control Interface for Controllable Ballasts (0-10V)
   2. 62386, Digital Addressable Lighting Interface (DALI)

G. National Electrical Manufacturers Association (NEMA)
   1. LSD 63-2012, Measurement Methods and Performance Variation for Verification Testing of General Purpose Lamps and Systems

H. Underwriters Laboratories (UL)
   1. 1998 Third Edition (or latest), Luminaires

1.03 DEFINITIONS

A. Lighting terminology used herein is defined in IES RP-16. See referenced documents for additional definitions.

B. Exception: The term “driver” is used herein to broadly cover both drivers and power supplies, where applicable.

C. Clarification: The term “LED light source(s)” is used herein per IES LM-80 and TM-21 to broadly cover LED package(s), module(s), and array(s).

1.04 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Submittal procedures.

B. Shop Drawings: Indicate dimensions and components for each luminaire not standard product of manufacturer.

C. Product Data: Submit dimensions, ratings, and performance data.

1.05 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.06 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.07 MAINTENANCE MATERIALS

A. Section 017000 - Execution and Closeout Requirements: Spare parts and maintenance products.

PART 2 - PRODUCTS

2.01 INTERIOR LUMINAIRES

A. Product Description: Complete interior luminaire assemblies, with features, options, and accessories as scheduled.

B. Substitutions: Section 012513 – Substitution Procedures.

2.02 LED LIGHT ENGINE:

A. High efficacy LED engine equipped with brand-name LEDs available in outputs of 100%, 85%, 70% and 55%.
   1. 1L35 (100%)
   2. 1L30 (85%) Requires Dimming option
   3. 1L25 (70%) Requires Dimming option
   4. 1L20 (55%) Requires Dimming option
      a. All drivers are Electronic Class 2, high efficiency with the following PFC:
         1) Standard Non-Dimming Driver (PFC>0.95).
         2) Optional 0-10v, & Dali Dimming Drivers (PFC>0.90).
         3) Optional Lurton 3-wire and Eco-System Dimming Drivers (PFC 0.99).

B. CCT packages shall be available in 2700K, 3000K, 3500K and 4000K. CCT tolerances are to be kept within a 3-step MacAdam ellipse and are to maintain a Min CRI of 80.
   1. 27 (2700K)
   2. 30 (3000K)
   3. 35 (3500K)
   4. 40 (4000K)

PART 3 - EXECUTION

3.01 EXISTING WORK

A. Disconnect and remove abandoned luminaires, lamps, and accessories.

3.02 INSTALLATION

A. Install suspended luminaires using pendants supported from swivel hangers. Install pendant length required to suspend luminaire at indicated height.

B. Support luminaires independent of ceiling framing.

C. Install surface mounted luminaires plumb and adjust to align with building lines and with each other. Secure to prevent movement.

D. Install wall-mounted luminaires at height as indicated on Drawings.

E. Install accessories furnished with each luminaire.

F. Connect luminaires to branch circuit outlets provided under Section 260533 using flexible conduit.

G. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.

H. Install specified lamps in each luminaire.

I. Ground and bond interior luminaires in accordance with Section 260526.

3.03 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements and 017000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

3.04 ADJUSTING

A. Section 017000 - Execution and Closeout Requirements: Testing, adjusting, and balancing.

B. Aim and adjust luminaires as indicated on Drawings. Coordinate final aiming in field with Architect/Owner.

3.05 CLEANING

A. Section 017000 - Execution and Closeout Requirements: Final cleaning.

B. Remove dirt and debris from enclosures.

C. Clean photometric control surfaces as recommended by manufacturer.

D. Clean finishes and touch up damage.

3.06 PROTECTION OF FINISHED WORK

A. Section 017000 - Execution and Closeout Requirements: Protecting finished work.

B. Relamp luminaires having failed lamps at Substantial Completion.

END OF SECTION

SECTION 265600

EXTERIOR LIGHTING

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes exterior luminaries, poles, and accessories.

1.02 REFERENCES

A. American National Standards Institute (ANSI):
   1. C78.377-2011 (or latest), American National Standard for the Chromaticity of Solid State Lighting Products
   2. C82.77-2002 (or latest), American National Standard for Harmonic Emission Limits - Related Power Quality Requirements for Lighting Equipment
   3. C136.2-2014 (or latest), American National Standard for Roadway and Area Lighting Equipment – Dialectric Withstand and Electrical Immunity Requirements
   4. C136.10-2010 (or latest), American National Standard for Roadway and Area Lighting Equipment – Locking-Type Photocontrol Devices and Mating Receptacles— Physical and Electrical Interchangeability and Testing
   5. C136.15-2011 (or latest), American National Standard for Roadway and Area Lighting Equipment – Luminaire Field Identification
   6. C136.22-2004 R2009 (or latest), American National Standard for Roadway and Area Lighting Equipment – Internal Labeling of Luminaires
   7. C136.31-2010 (or latest), American National Standard for Roadway Lighting Equipment – Luminaire Vibration
   8. C136.37-2011 (or latest), American National Standard for Roadway and Area Lighting Equipment - Solid State Light Sources Used in Roadway and Area Lighting
   9. C136.41-2013 (or latest), American National Standard for Roadway and Area Lighting Equipment—Dimming Control Between an External Locking Type Photocontrol and Ballast or Driver

B. American Society for Testing and Materials International (ASTM)
   1. B117-11 (or latest), Standard Practice for Operating Salt Spray (Fog) Apparatus
   2. D523-08 (or latest), Standard Test Method for Specular Gloss
   3. D1654-08 (or latest), Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
   4. G154-06 (or latest), Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials

C. ENERGY STAR®
   1. ENERGY STAR TM-21 Calculator, rev. 020712 (or latest, www.energystar.gov/TM-21Calculator)

D. Federal Communications Commission (FCC)
   1. 47 CFR Part 15, Telecommunication – Radio Frequency Devices

E. Federal Trade Commission (FTC)
   1. Complying with the Made in USA Standard, December 1998 (http://business.ftc.gov/advertising-and-marketing/made-usa)
   2. Green Guides, 16 CFR Part 260, Guides for the Use of Environmental Marketing Claims

F. Illuminating Engineering Society of North America (IESNA or IES)
   1. LM-50-13 (or latest), IES Approved Method for Photometric Measurement of Roadway and Street Lighting Installations
   2. LM-61-06 (or latest), IESNA Approved Guide for Identifying Operating Factors Influencing Measured Vs. Predicted Performance for Installed Outdoor High Intensity Discharge (HID) Luminaires
   3. LM-63-02 (R2008 or latest), ANSI/IESNA Standard File Format for the Electronic Transfer of Photometric Data and Related Information
   4. LM-79-08 (or latest), IESNA Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products
   5. LM-80-08 (or latest), IESNA Approved Method for Measuring Lumen Maintenance of LED Light Sources
   6. RP-8-00 (or latest), ANSI / IESNA American National Standard Practice for Roadway Lighting
   7. RP-16-10 (or latest), ANSI/IES Nomenclature and Definitions for Illuminating Engineering
   8. TM-15-11 (or latest), Luminaire Classification System for Outdoor Luminaires
   9. TM-21-11 (or latest), Projecting Long Term Lumen Maintenance of LED Light Sources

G. International Electrotechnical Commission (IEC)
   1. 60929 Annex E, Control Interface for Controllable Ballasts (0-10V)
   2. 62386, Digital Addressable Lighting Interface (DALI)

H. National Electrical Manufacturers Association (NEMA)
   1. LSD 63-2012, Measurement Methods and Performance Variation for Verification Testing of General Purpose Lamps and Systems

I. Underwriters Laboratories (UL)
   1. 1598 Third Edition (or latest), Luminaires

1.03 DEFINITIONS

A. Lighting terminology used herein is defined in IES RP-16. See referenced documents for additional definitions.

B. Exception: The term “driver” is used herein to broadly cover both drivers and power supplies, where applicable.

C. Clarification: The term “LED light source(s)” is used herein per IES LM-80 and TM-21 to broadly cover LED package(s), module(s), and array(s).

1.04 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Submittal procedures.

B. Shop Drawings: Indicate dimensions and components for each luminaire not standard Product of manufacturer.

C. Product Data: Submit dimensions, ratings, and performance data.

D. Luminaire cutsheets.

E. Cutsheets for LED light source(s).

F. Cutsheets for LED driver(s).

G. If dimmable LED driver is specified, provide diagrams illustrating light output and input power as a function of control signal.

H. For equal or substituted fixture provide computer-generated point-by-point photometric analysis of maintained light levels.

I. Documentation supporting any U.S. Origin claims for the product, in accordance with FTC guidance.

1.05 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Section 016500 – Transportation and Handling of Materials and Equipment: Requirements for transporting and handling products.

B. Section 016600 – Storage of Material: Requirements for storing and protecting products.

C. Store and handle solid wood poles in accordance with ANSI O5.1.

1.07 COORDINATION

A. Section 013113 – Project Coordination: Coordination and project conditions.

B. Furnish bolt templates and pole mounting accessories to installer of pole foundations.

1.08 MAINTENANCE MATERIALS

A. Section 017000 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Furnish two gallons of touch-up paint for each different painted finish and color.

C. Furnish two drivers of each lamp type installed.

PART 2 - PRODUCTS

2.01 LUMINAIRES

A. Product Description: Complete exterior luminaire assemblies, with features, options, and accessories as scheduled.

B. Section 016500 – Transportation and Handling of Materials and Equipment and Section 016600 – Storage of Material: Requirements for product options.

2.02 LED FIXTURES

A. Luminaire shall be designed for ease of component replacement and end-of-life disassembly.

B. LED light source(s) and driver(s) shall be RoHS compliant.

C. Nominal luminaire input wattage shall account for nominal applied voltage and any reduction in driver efficiency due to sub-optimal driver loading.

D. Luminaire shall accept the voltage or voltage range specified at 50/60 Hz, and shall operate normally for input voltage fluctuations of plus or minus 10 percent.

E. All internal components shall be assembled and pre-wired using modular electrical connections.

F. The following shall be in accordance with corresponding sections of ANSI C136.37.
   1. Wiring and grounding
   2. Terminal blocks for incoming AC lines (electrical mains wires)
   3. Photocontrol receptacle
   4. Latching and hinging
   5. Mounting provisions
   6. Ingress protection

G. Painted or finished luminaire surfaces exposed to the environment
   1. Shall exceed a rating of six per ASTM D1654 after 1000 hours of testing per ASTM B117.
   2. The coating shall exhibit no greater than 30% reduction of gloss per ASTM D523, after 500 hours of QUV testing at ASTM G154 Cycle 6.

H. Thermal management
   1. Luminaire shall start and operate in ambient temperature range specified.
   2. Maximum rated case temperature of driver and other internal components shall not be exceeded when luminaire is operated in ambient temperature range specified.
   3. Mechanical design of protruding external surfaces (heat sink fins) shall facilitate hose-down cleaning and discourage debris accumulation.

2.03 LED DRIVER, PHOTOCONTROL RECEPTACLE, AND CONTROL INTERFACE

A. Luminaire designation(s) indicated without a photo control receptacle need not accept a control signal, and do not require a dimmable driver. If luminaire cannot be furnished without photocontrol receptacle, luminaire shall be furnished with ANSI C136.10 compliant photocontrol receptacle and shorting cap as directed by Owner.

B. Luminaire designation(s) indicated "with a photo control receptacle shall be fully prewired and shall incorporate an ANSI C136.41 compliant receptacle. If a dimmable LED driver is specified, its 0-10V or DALI control wires shall be connected to the receptacle pads as specified in ANSI C136.41.

2.04 ELECTRICAL SAFETY TESTING

A. Luminaire shall be listed for wet locations by a U.S. Occupational Safety Health Administration (OSHA) Nationally Recognized Testing Laboratory (NRTL).

B. Luminaire shall have locality-appropriate governing mark and certification.

C. Luminaire shall meet the performance requirements specified in ANSI C136.2 for dielectric withstand, using the DC test level and configuration.

2.05 ELECTRICAL IMMUNITY

A. Luminaire shall meet the performance requirements specified in ANSI C136.2 for electrical immunity, using the combination wave test level.

B. Manufacturer shall indicate on submittal form whether failure of the electrical immunity system can possibly result in disconnect of power to luminaire.

2.06 INTERFERENCE AND POWER QUALITY

A. Luminaire shall comply with FCC 47 CFR part 15 interference criteria for Class A (non-residential) digital devices.

B. Luminaire shall comply with section 5.2.5 (luminaires rated for outdoor use) of ANSI C82.77 at full input power and across specified voltage range.

2.07 COLOR ATTRIBUTES

A. Color Rendering Index (CRI) shall be no less than 80.

B. Nominal Correlated Color Temperature (CCT) shall be as specified on drawing.

Allowable CCT and Duv (adapted from ANSI C78.377)

Manufacturer-Rated Nominal CCT (K)	Allowable IES LM-79 Chromaticity Values	
	Measured CCT (K)	Measured Duv
2700	2580 to 2870	-0.006 to 0.006
3000	2870 to 3220	-0.006 to 0.006
3500	3220 to 3710	-0.005 to 0.007
4000	3710 to 4260	-0.005 to 0.007
4500	4260 to 4746	-0.004 to 0.008
5000	4746 to 5311	-0.004 to 0.008
5700	5312 to 6020	-0.003 to 0.009
6500	6022 to 7040	-0.003 to 0.009

C. If submitted nominal CCT is not listed above, measured CCT and Duv shall be as per the criteria for Flexible CCT defined in ANSI C78.377.

2.08 IDENTIFICATION

A. Luminaire shall have an external label per ANSI C136.15.

B. Luminaire shall have an internal label per ANSI C136.22.

2.09 METAL POLES

A. Manufacturers:
1. Lithonia.
2. Millerbernd Manufacturing.
3. RAB Lighting.
4. Substitutions: Section 012513 – Substitution Procedures.

B. Material and Finish: As indicated on Drawings.

C. Section Shape and Dimensions: As indicated on Drawings.

D. Height: As indicated on Drawings.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Section 013113 – Project Coordination: Coordination and Project conditions.

B. Verify foundations are ready to receive fixtures.

3.02 INSTALLATION

A. Install concrete bases for lighting poles at locations as indicated on Drawings, in accordance with Section 033000 – Cast-in-Place Concrete.

B. Install poles plumb. Install double nuts to adjust plumb. Grout around each base.

C. Bond and ground luminaries, metal accessories and metal poles in accordance with Section 260526 – Grounding and Bonding for Electrical Systems. Install supplementary grounding electrode at each poles.

3.03 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements and 017000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Operate each luminaire after installation and connection. Inspect for improper connections and operation.

C. Measure illumination levels to verify conformance with performance requirements.

D. Take measurements during night sky, without moon or with heavy overcast clouds effectively obscuring moon.

3.04 ADJUSTING

A. Section 017000 - Execution and Closeout Requirements: Testing, adjusting, and balancing.

B. Aim and adjust luminaries to provide illumination levels and distribution as indicated on Drawings.

3.05 CLEANING

A. Section 017000 - Execution and Closeout Requirements: Final cleaning.

B. Clean photometric control surfaces as recommended by manufacturer.

C. Clean finishes and touch up damage.

3.06 PROTECTION OF FINISHED WORK

A. Section 017000 - Execution and Closeout Requirements: Protecting finished work.

B. Luminaries having failed at Substantial Completion.

END OF SECTION

SECTION 310513.95

RESTORATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

The work specified shall include all labor, material, equipment, services and incidentals necessary to restore surfaces, pavements, sidewalks, driveways, curbs, gutters, lawns, culverts, and other features disturbed, damaged, or destroyed during the performance of the work under or as a result of the operations of the Contract.

B. Related Work Specified Elsewhere

1. Section 033000 – Cast-in-Place Concrete
2. Section 312323 - Select Granular Materials
3. Section 312333 - Excavation, Backfill, and Trenching

1.02 QUALITY ASSURANCE

A. The quality of materials and the performance of work used in the restoration shall produce a surface or feature equal to the condition of each before the work began.

B. Reference Standards

1. American Association of Nurserymen (AAN)
2. ASTM D698, Standard Compaction Test
3. ASTM D2487, Classification of Soils for Engineering
4. ASTM D2974, Standard Test Method for Moisture, Ash and Organic Matter of Peat and Other Organic Soils
5. New York State Department of Transportation Standard Specifications, latest revision

1.03 SUBMITTALS

A. CONTRACTOR shall submit the following submittals:

1. The location of source and data for off-site topsoil.
2. Analysis of the seed.
3. Should a hydroseeder be used, the CONTRACTOR shall submit all data including material and application rates.
4. Mix designs for asphalt.

1.04 SCHEDULE OF RESTORATION

A. A schedule of restoration operations shall be submitted by the CONTRACTOR for review.
   1. After an accepted schedule has been agreed upon it shall be adhered to unless otherwise revised by the ENGINEER.

B. In general, permanent restoration of traveled surfaces will not be permitted until one month time has elapsed after excavations have been completely backfilled as specified.

C. The replacement of surfaces at any time, as scheduled or as directed, shall not relieve the CONTRACTOR of responsibility to repair damages by settlement or other failures.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Topsoil shall be unfrozen friable clayey loam free from clay lumps, stones, roots, sticks, stumps, brush, hazardous materials, or foreign objects.

B. Fertilizer shall be a standard quality commercial carrier of available plant food elements. A complete prepared and packaged material containing a minimum of 10 percent nitrogen, 10 percent phosphoric acid and 10 percent potash.
   1. Each bag of fertilizer shall bear the manufacturer's name and guaranteed statement of analysis.

C. Seed mixtures shall be of commercial stock of the current season's crop and shall be delivered in unopened containers bearing the guaranteed analysis of the mix.
   1. All seed shall meet the New York State Department of Transportation 713-04 standard specifications for germination and purity.

D. Seed Mixtures:

Specia	Lawn Areas*	Non-maintained Areas*
Kentucky Bluegrass	50	20
Creeping Red Fescue	30	20
Manhattan or Pennfine Ryegrass	20	60

* % by weight

E. Mulch shall be stalks of oats, wheat, rye or other acceptable crops which are free from noxious weeds.

2.02 MATERIALS

A. Paving Materials: The source and gradation of materials shall be acceptable to the ENGINEER. Materials shall be as defined on contract drawings, and if not defined on contract drawings shall conform to the following:

1. Pavement Sub-Base Course Material: The sub-base course materials shall be select backfill material as specified in Section 312323 of the Specifications.
2. Tack Coat: The tack coat shall be NYSDOT Section 702, Item 702-3401 Asphalt Emulsion (HFMS-2H).
3. Bituminous Base Course: Base course where required shall be placed in accordance with the NYSDOT Specifications, Section 402 – Hot Mix Asphalt Concrete Pavement. The material shall be NYSDOT, Item 402.378903, 37.5 F9 Base Course HMA, 80 Series Compaction.
4. Bituminous Binder Course: Binder course pavement where required shall be placed in accordance with NYSDOT Specifications, Section 402 – Hot Mix Asphalt Concrete Pavement. The binder course pavement material shall be NYSDOT Item No. 402.198903 19 F9 Binder Course HMA, 80 Series Compaction.
5. Bituminous Surface Course: The bituminous concrete surface course shall be a hot mix bituminous material consisting of a mixture of mineral aggregate and asphalt cement as approved by ENGINEER. The surface course shall be NYSDOT Item No. 402.098203 9.5 F2 Top Course HMA, 80 Series Compaction.

2.03 MATERIALS TESTING.

A. All materials must be tested and approved prior to delivery to the site. Samples of materials proposed for use shall be submitted by the CONTRACTOR to the ENGINEER and the testing laboratory. Samples of the materials shall be submitted at least ten days in advance of its anticipated use.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Temporary Pavement

1. Immediately upon completion of backfilling of a trench or excavation, the CONTRACTOR shall place a temporary pavement over all disturbed areas of streets, driveways, and other traveled places where the original surface has been disturbed as a result of his operations.
2. The temporary pavement shall consist of compacted select backfill surfaced with cold patch to such a depth as required to withstand the traffic to which it will be subjected.
3. The surface of the temporary pavement shall conform to the slope and grade of the area being restored.

4. For dust prevention, the CONTRACTOR shall treat all surfaces, not covered with cold patch, as frequently as may be required
5. The temporary pavement shall be maintained by the CONTRACTOR in a safe and satisfactory condition until such time as the permanent paving is completed. The CONTRACTOR shall immediately remove and restore all pavement as shall become unsatisfactory.

B. Permanent Pavement Replacement

1. The permanent and final re-paving of all streets, driveways and similar surfaces where pavement has been removed, disturbed, settled or damaged by or as a result of performance of the Contract shall be repaired and replaced by the CONTRACTOR, with a new and similar pavement, in accordance with the contract documents and matching the existing pavement or as required by the local community or Highway Permit.
   a. The top surface shall conform with the grade of existing adjacent pavement and the entire replacement shall meet the current specifications of the local community for the particular types of pavement.
   b. Where the local community has no specification for the type of pavement, the work shall be done in conformity with the New York State Department of Transportation Standard which conforms the closest to the type of surfacing being replaced, as determined by the ENGINEER and with the following specifications:
      1) Unless specified otherwise, replacement of existing roads under the jurisdiction of New York State, Counties or Cities, shall be constructed to the following requirements:
         a) Pavement subbase as outlined under Section 312323.
         b) Base Course Pavement – 8 inches minimum compacted thickness or combination of concrete base where encountered.
         c) Binder Course Pavement – 1-$^1/_2$ inches minimum compacted thickness.
         d) Surface Course Pavement – 1 inch minimum compacted thickness.
      2) Unless specified otherwise, replacement of existing roads under the jurisdiction of Towns or Villages shall be constructed to the following requirements:
         a) Pavement subbase as outlined under Section 312323.
         b) Binder Course Pavement – 4 inches minimum compacted thickness.
         c) Surface Course Pavement – 2 inches minimum compacted thickness.

c. All required permits for local governing bodies shall be obtained.
d. Install or reinstall pavement striping in accordance with NYSDOT Standard Specifications.

C. Preparation for Permanent Pavement

1. When scheduled and within the time specified, the temporary pavement shall be removed and base prepared, at the depth required by the local community or Highway Permit, to receive the permanent pavement.
   a. The base shall be brought to the required grade and cross-section and thoroughly compacted before placing the permanent pavement.
   b. Any base material which has become unstable for any reason shall be removed and replaced with compacted base materials.
   c. Cuts which are not straight will require another saw-cutting further from the trench. Additional select backfill and pavement needed for restoration outside the defined pay limits will be installed and paid for by the CONTRACTOR.
2. Prior to placing the permanent pavement, all service boxes, manhole frames and covers and similar structures within the area shall be adjusted to the established grade and cross-section.
3. The edges of existing asphalt pavement shall be cut a minimum of one foot beyond the excavation or disturbed base whichever is greater.
   a. All cuts shall be parallel or perpendicular to the centerline of the street.
   b. All cuts will be made in straight continuous lines by saw-cutting or other acceptable technique.
   c. Additional one-foot saw cut may be required for top course if shown on the drawings or required by permit.
4. Install or reinstall traffic inductance loops in accordance with NYSDOT Standard Specifications by a firm which is qualified by the NYSDOT.

D. Bituminous Tack Coat

1. The tack coat shall be uniformly applied by a pressure distributor to a prepared clean pavement. The tack coat shall be applied as approved by the ENGINEER to offer the least inconvenience to traffic and to permit one-way traffic, where practical, to prevent pickup or tracking of the bituminous material.
2. Tack coat shall not be applied on a wet pavement surface or when the surface temperature is below 45 degrees F. The temperature and areas to be treated shall be approved by the ENGINEER prior to application. The application rate shall be 0.03 to 0.07 gallons per square yard as approved by the ENGINEER.

E. Asphalt Pavement

1. The permanent asphalt pavement replacement for streets, driveways and parking area surfaces shall be replaced with bituminous materials of the same depth and kind as the existing unless otherwise specified.

2. Prior to placing of any bituminous pavement tack coat shall be applied to the edges of the existing pavement and other features.
3. The furnishing, handling and compaction of all bituminous materials shall be in accordance with the New York State Department of Transportation Standards latest edition.

F. Cold Milling
1. Cold milling of existing surfaces shall follow New York State Department of Transportation Standard Specifications, latest edition.
2. Material removed during the milling process will become the property of the CONTRACTOR and shall be disposed of at an acceptable location off-site.
3. CONTRACTOR must maintain drainage into all gutters and catch basins during the milling operation.

G. Concrete Pavement and Pavement Base
1. Concrete pavements and concrete bases for asphalt, brick or other pavement surfaces shall be replaced with Class "A" concrete, air-entrained as specified in Section 033000.
2. Paving slabs or concrete bases shall be constructed to extend one foot beyond each side of the trench and be supported on undisturbed soil. Where such extension of the pavement will leave less than two feet of original pavement slab or base, the repair of the pavement slab or base shall be extended to replace the slab to the original edge of the pavement or base unless otherwise indicated on the Contract Drawings.
3. Where the edge of the pavement slab or concrete base slab falls within the excavation, the excavation shall be backfilled with Select Backfill compacted to 95 percent maximum dry density as determined by ASTM D698 up to the base of the concrete.
4. The new concrete shall be of the same thickness as the slab being replace and shall contain reinforcement equal to the old pavement.
    a. New concrete shall be placed and cured in accordance with the applicable provisions of the State Department of Transportation Standards.

H. Stone or Gravel Pavement
1. All pavement and other areas surfaced with stone or gravel shall be replaced with material to match the existing surface unless otherwise specified.
    a. The depth of the stone or gravel shall be at least equal to the existing or at least 6 inches.
    b. After compaction, the surface shall conform to the slope and grade of the area being replaced.
    c. Stone material used shall comply with the New York State Department of Transportation Standard Specifications, latest edition.

I. Driveways

1. Asphalt Driveways

a. After the watermain has been installed and the trench properly backfilled, the CONTRACTOR shall cut back the drive one foot each side of the trench. The asphalt shall be cut with carborundum saw or other device to give a uniform and continuous straight edge. Where watermains or service piping are installed under drive aprons the ENGINEER may specify the replacement of the entire apron and the CONTRACTOR shall remove and replace same to its base.

b. The cut edge shall be painted with a bituminous seal coat and asphalt shall then be replaced to equal or exceed the existing asphalt in quality and depth.

1) In no case shall the finished thickness of the asphalt driveway be less than four (4) inches, a minimum of three (3) inches of binder and one (1) inch of top to match the existing driveway.

2) Courses shall be laid in one (1) inch lifts and compacted with a minimum two (2) ton roller or other mechanical means specified by the ENGINEER.

3) If the existing drive was in the opinion of the ENGINEER recently sealed, then the CONTRACTOR shall apply one (1) coat of coal tar emulsion sealer over the top lift. In no case shall cold patch be considered pavement, but may be used temporarily as an expedient, the cost of which will be borne by the CONTRACTOR.

2. Concrete Driveways

a. The CONTRACTOR shall be responsible for the proper consolidation of the sub-grade before laying the new driveway, and any settlement or failure of the new driveway shall be repaired or replaced by the CONTRACTOR to the satisfaction of the ENGINEER.

b. Where drives are encountered, the CONTRACTOR shall cut the concrete each side of the trench limits using a concrete saw at breaks in the drive or at expansion joints at the direction of the ENGINEER. Any concrete broken beyond the cut or break line will be replaced at the CONTRACTOR'S expense.

c. The drive shall then be replaced to equal or exceed the existing drive in quality and depth.

1) Reinforcing shall be installed in all replacements, tieing it to existing reinforcing where it protrudes from the cut edge. 6 x 6 x 6 welded wire mesh or equal shall be used. The CONTRACTOR shall then install Transit Mix Concrete meeting NYSDOT specifications to the depth of the

original base, or a minimum of six (6") inches, whichever is more.

2) The surface shall be finished to match the existing surface. The CONTRACTOR shall properly cure all concrete after placing and shall protect it from damage from all types of

Lawns and Improved Areas

1. The area to receive topsoil shall be graded to a depth of not less than 4 inches or as specified, below the proposed finished surface. If the depth of existing topsoil prior to construction was greater than 4 inches, topsoil shall be replaced to that depth.
   a. All debris and inorganic material shall be removed and the surface loosened for a depth of 2 inches prior to the placing of the topsoil.
   b. The topsoil shall not be placed until the subgrade is in suitable condition and shall be free of excessive moisture and frost.
   c. Topsoil placed in areas of earth excavation will not be placed until suitable earth compaction has been performed.
2. Satisfactory topsoil removed from the excavations shall be placed on the prepared subgrade to the depth required.
   a. In the event the topsoil removed during excavation is unsatisfactory or inadequate to obtain the required finish grades, the CONTRACTOR shall furnish the required quantity of satisfactory topsoil from specified sources off site.
   b. All topsoil shall be free from stones, roots, sticks and other foreign substances and shall not be placed in a frozen or muddy condition.
   c. The finished surface shall conform to the lines and grades of the area before disturbed or as shown on the Contract Drawings. Any irregularities shall be corrected before the placement of fertilizer and seed.
3. The fertilizer shall be applied uniformly at the rate of 20 pounds per 1000 square feet.
   a. Following the application of the fertilizer and prior to application of the seed, the topsoil shall be scarified to a depth of at least 2 inches with a disc or other suitable method traveling across the slope if possible.
4. When the topsoil surface has been fine graded, the seed mixture shall be uniformly applied upon the prepared surface with a mechanical spreader at a rate of not less than 5 pounds per 1000 square feet.
   a. The seed shall be raked lightly into the surface and rolled with a light hand lawn roller.
   b. Seeding and mulching shall not be done during windy weather.
5. The mulch shall be hand or machine spread to form a continuous blanket over the seed bed, approximately 2 inches uniform thickness at loose measurement. Excessive amounts or bunching of mulch will not be permitted.
   a. Mulch shall be anchored by an acceptable method.

b. Unless otherwise specified, mulch shall be left in place and allowed to disintegrate.

c. Any anchorage or mulch that has not disintegrated at time of first mowing, shall be removed. Anchors may be removed or driven flush with ground surface.

6. Seeded areas shall be watered as often as required to obtain germination and to obtain and maintain a satisfactory sod growth. Watering shall be in such a manner as to prevent washing out of seed. Any washout or damage which occurs shall be regraded and reseeded until a good sod is established.

7. Hydroseeding may be accepted as an alternative method of applying fertilizer, seed and mulch. The CONTRACTOR must submit all data regarding materials and application rates to the ENGINEER for review.

8. The CONTRACTOR shall maintain the newly seeded areas, including regrading, reseeding, watering and mowing, in good condition, until the development of an established cover.

J. Cultivated Area Replacement

1. Areas of cultivated lands shall be graded to a depth to receive topsoil of not less than the depth of the topsoil before being disturbed. All debris and inorganic material shall be removed prior to placing of the topsoil.

2. After the topsoil has been placed and graded, the entire area disturbed during construction shall be cultivated to a minimum depth of 12 inches with normal farm equipment.

a. Any debris or inorganic materials appearing shall be removed.

b. The removal of stones shall be governed by the adjacent undisturbed cultivated area.

3. Grass areas shall be re-seeded using a mixture equal to that of the area before being disturbed, unless otherwise specified.

K. Other Types of Restoration

1. Shrubs and landscape items damaged or destroyed as a result of the construction operations shall be replaced in like species and size.

a. All planting and care thereof shall meet the standards of the American Association of Nurserymen.

2. Water courses shall be reshaped to the original grade and cross-section and all debris removed. Where required to prevent erosion, the bottom and sides of the water course shall be protected.

3. Culverts destroyed or removed as a result of the construction operations shall be replaced in like size and material and shall be replaced at the original location and grade. When there is minor damage to a culvert and with the consent of the ENGINEER, a repair may be undertaken, if satisfactory results can be obtained.

4. Should brick pavements be encountered in the work, the restoration shall be as set forth in the General Requirements or as directed.

5. Items removed for construction such as mailboxes, signposts, reflector markers, and the like shall be replaced in as good or better condition than existing. Items damaged by the CONTRACTOR shall be replaced at his expense. Privately owned items, such as mailboxes, shall be reinstalled to the satisfaction of the OWNER and ENGINEER.

L. Lawn Maintenance

1. All lawn areas shall be mowed by the CONTRACTOR before the new grass reaches a height of 4 inches.
   a. Following the establishment of a good stand of grass and the first mowing, the CONTRACTOR'S obligation shall end except for the repair of settlement or damage
2. Any lawn area which does not develop an established cover shall be re-seeded and maintained at the CONTRACTOR'S expense until an established cover is present.

END OF SECTION

SECTION 312323

SELECT GRANULAR MATERIALS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified
Select granular materials shall be used in bedding, pipe encasement, or backfill and as specified or as directed by the ENGINEER.

B. Related Work Specified Elsewhere
1. Section 312333 - Excavation, Backfill and Trenching

1.02 QUALITY ASSURANCE

A. Reference Standards
1. NYSDOT Standards, latest revision

1.03 SUBMITTALS

A. The CONTRACTOR shall furnish representative samples, sieve analysis and certification of specification compliance for the select granular materials to the ENGINEER and advise on the location of the source.

B. The CONTRACTOR shall submit copies of proposed materials, methods and operations of backfilling and compaction to the ENGINEER for review prior to the start of work. A list of equipment to be used in CONTRACTOR'S Methods and Operations must be included.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Bedding and Pipe Encasement
1. NYSDOT No. 1 Crushed Stone or Crushed Gravel – bedding for PVC, DIP, and PCCP watermain.
Thoroughly washed, clean, sound, tough, hard, crushed limestone conforming to the requirements of NYSDOT Item No. 703.0201 or crushed gravel conforming to the requirements of NYSDOT Item No. 703.0202, having the following gradation by weight:

% Passing	Sieve
100	1-inch
90 - 100	1/2-inch
0 - 15	1/4-inch

2. NYSDOT No. 2A Crushed Stone or Crushed Gravel – bedding for DIP and PCCP watermain.
Shall be a No. 1 and No. 2 blend, thoroughly washed, clean, sound, tough, hard, crushed limestone conforming to the requirements of NYSDOT Item No. 703.0201 or crushed gravel conforming to the requirements of NYSDOT Item No. 703.0202, having the following gradation by weight:

% Passing	Sieve
100	1-1/2-inch
93-100	1-inch
27-58	1/2-inch
0-8	1/4-inch

3. NYSDOT Concrete Sand – bedding for copper and polyethylene tubing.
Washed, fine aggregate sand shall conform to the requirements of NYSDOT Item No. 703.07, having the following gradation by weight:

% Passing	Sieve
100	3/8-inch
90 - 100	No. 4
75 - 100	No. 8
50 - 85	No. 16
25 - 60	No. 30
10 - 30	No. 50
1 - 10	No. 100
0 - 3	No. 200

B. Select Backfill

1. NYSDOT Subbase Type 2 Crusher Run Stone or Crusher Run Gravel.
Material shall conform to the requirements of NYSDOT Item No. 304.12, having the following gradation by weight:

% Passing	Sieve
100	2-inch
25 - 60	1/4-inch
5 - 40	No. 40
0 - 10	No. 200

C. Peagravel

1. NYSDOT Type 1A Screened Gravel for the annular space between the carrier pipe and the casing pipe.
   Screened gravel shall conform to the requirements of NYSDOT Item No. 703.0203 and have the following gradation by weight:

% Passing	Sieve
100	1/2-inch
90 - 100	1/4-inch
0 - 15	1/8-inch

D. Follow NYSDOT Standard Specifications if gradation data varies from those listed above.

E. Recycled concrete or asphalt pavement shall not be allowed.

F. Slag of any type shall not be allowed.

G. Flowable Fill shall comply with NYSDOT Item 733-0102 – Controlled Low Strength Material (No Fly Ash).

PART 3 - EXECUTION

3.01 INSTALLATION

A. General

1. Select granular material as specified or directed for watermain bedding or encasement shall be placed in accordance with Section 312333 - Excavation, Backfill and Trenching.
2. Select backfill where specified or directed shall be placed in accordance with the backfilling provisions of Section 312333 - Excavation, Backfill & Trenching.
3. Flowable Fill (Controlled Low Strength Material) shall only be used where defined on the contract drawings and approved for use by the ENGINEER and OWNER.

3.02 DISPOSAL OF DISPLACED MATERIALS

A. Materials displaced through the use of the above materials shall be wasted or disposed of by the CONTRACTOR and the cost of such disposal shall be included in the appropriate bid item.

END OF SECTION

SECTION 312333

EXCAVATION, BACKFILL, AND TRENCHING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified
   1. The CONTRACTOR shall furnish all labor, materials, equipment, and incidentals necessary for excavation, trenching, backfill, and compaction as shown and specified. Disposal of excess and unsuitable excavated material is included.
   2. Backfill of excavations with acceptable materials as specified in other Sections.

B. Related Work Specified Elsewhere
   1. Section 310513.95 – Restoration
   2. Section 312323 - Select Granular Materials

1.02 QUALITY ASSURANCE

A. Reference Standards
   1. ASTM A36, Structural Steel
   2. ASTM A328, Steel Sheet Piling
   3. ASTM D422, Particle-Size Analysis of Soils
   4. ASTM D698, Moisture-Density Relations of Soils, using 5.5 lb. Rammer and 12-inch Drop
   5. ASTM D1556, Density of Soil in Place by the Sand-Cone Method
   6. ASTM D1557, Moisture-Density Relations of Soils, using 10 lb. Rammer and 18-inch Drop
   7. ASTM D2321, Recommended Practices for Underground Installation of Pipe for Sewers and Other Gravity Flow Applications
   8. ASTM D2922, Density of Soil and Soil-Aggregate in Place by Nuclear Method (Shallow Depth)
   9. AISC Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings
   10. Occupational Safety and Health Administration (OSHA) Regulations
   11. Industrial Code Rule 23

1.03 SUBMITTALS

A. Before any excavation begins, the CONTRACTOR shall obtain all permits and licenses required by governing authorities having jurisdiction and submit certified copies to ENGINEER prior to work being performed.

B. The CONTRACTOR shall submit drawings submitted with a PE stamp, for information only, for the following items as required:
   1. Sheeting, shoring and bracing
   2. Dewatering systems
   3. Additional protection systems required
   4. Sediment and Erosion control

C. The CONTRACTOR shall submit proposed materials, methods and operations of backfilling and compaction to the ENGINEER for review prior to the start of work. A list of equipment to be used in CONTRACTOR'S methods and operations must be included.

D. All drawings shall be prepared and sealed by an independent professional engineer recognized as an expert in the specialty involved and licensed to practice in the State of New York. The drawings shall be submitted to the ENGINEER to establish compliance with the terms of the Contract Documents. Calculations shall not be submitted. Drawing submissions will not be checked and will not imply approval by the ENGINEER of the work involved. CONTRACTOR shall be wholly responsible for designing, installing, and operating whatever system is necessary to accomplish satisfactory sheeting, bracing, protection, underpinning, and dewatering.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Bedding and Select Backfill
   1. Bedding and select backfill material shall be in accordance with Section 312323 - Select Granular Materials.

B. Backfill and Fill Materials
   1. Excavated materials may be used for backfill provided:
      a. Material is sandy, loamy or similar to bank run gravel.
      b. Material is free of debris, hazardous materials, frozen materials, organic or other deleterious materials. Material greater than 4-inches in any direction is unacceptable. Material greater than 2-inches in any direction is unacceptable for backfill directly against the watermain.
      c. Maximum dry density and optimum moisture content are determined in accordance with the above.
      d. Material is reviewed and deemed acceptable by the ENGINEER.
   2. Use select granular backfill within 5 feet or within a 1 on 1 slope from the trench to the edge of pavement of all roadways.

C. Topsoil
   1. Topsoil shall be furnished and installed and coordinated with Section 310513.95, Restoration.

D. Explosives
   1. Explosives are not allowed to be used nor allowed on site.

E. Sheeting, Shoring & Bracing
   1. Used material shall be in good condition, not damaged or excessively pitted. Unless otherwise specified, all sheeting to remain in place shall be new. New or used sheeting may be used for temporary work.
   2. All timber used for breast boards (lagging) shall be new or used, meeting the requirements for Douglas Fir Dense Construction grade or Southern Pine No. 2 Dense S3. Where close or tight sheeting is required, wood sheeting shall be tongued and grooved.
   3. All steel work for sheeting, shoring, bracing, cofferdams, etc. shall be designed in accordance with the provisions of the "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings", of the AISC except that field welding will be permitted.
   4. Steel sheet piling shall be manufactured from steel conforming to ASTM A328. Steel soldier piles, wales and braces shall be new or used and shall conform to ASTM A36.
   5. Steel sheeting shall have a minimum thickness of $^{3}/_{8}$-inch in web, unless otherwise specified.

PART 3 - EXECUTION

3.01 INSPECTION

A. The CONTRACTOR shall provide the ENGINEER with sufficient time and means to examine the areas and conditions under which excavating, filling and grading are to be performed. The CONTRACTOR shall notify the ENGINEER of conditions detrimental to the proper and timely completion of work. The CONTRACTOR shall not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to the ENGINEER.

3.02 TEST PITS

A. Where shown or ordered by the ENGINEER, the CONTRACTOR shall excavate and backfill test pits in advance of construction to determine conditions or location of existing facilities. The CONTRACTOR shall perform all work required in connection with excavating, stockpiling, maintaining, sheeting, shoring, backfilling and restoring the surface for the test pits.

B. Test pits which the CONTRACTOR excavates that are not shown on the Drawings or specified or ordered shall be at the CONTRACTOR'S expense.

C. No test pits will be dug prior to utility company stakeout.

D. Cold patch for temporary repair shall be placed as directed by the ENGINEER.

3.03 EROSION CONTROL

A. All necessary precautions shall be taken to preclude the contamination of any wetland or waterway by suspended solids, sediment, fuels, solvents, lubricants, epoxy coatings, paints, concrete leachate or any other environmentally deleterious substance associated with the project.

B. All necessary precautions shall be taken to prevent the entry of raw concrete or concrete liquors into the waters and/or wetlands of the State of New York. Equipment washwater from this project shall not be allowed to enter any waterway or wetland.

C. All sediments are to be retained on the project site through the use of hay bales, silt fences or other barriers, as specified or approved by the local authority having jurisdiction, to prevent erosion.

D. All areas of soil disturbance resulting from this project shall be seeded with an appropriate perennial grass seed and mulched with hay or straw within one week of final grading. Mulch shall be maintained until a suitable vegetative cover has been established.

E. Pumped groundwater collected from excavations shall not be allowed to be discharged directly to any wetland, waterway, or other water body.

F. Contamination of any wetland, waterway, or other water body shall be cleaned and/or restored to the satisfaction of the ENGINEER and governing authorities at the expense of the CONTRACTOR.

3.04 EXCAVATION

A. The CONTRACTOR shall perform all excavation required to complete the work as shown and specified. Excavations shall include earth, sand, clay, gravel, hardpan, boulders and ledge rock, decomposed rock, pavements, rubbish and all other materials within the excavation limits, except rock.

B. Excavations for pipelines, utilities and structures shall be open excavations, shored and braced where necessary, according to OSHA standards, to prevent possible injury to workmen and to new and existing structures or pipelines.

C. Where the pipeline, utility or structure is to be placed below the ground water table, well-points, cofferdams or other acceptable methods shall be used to permit construction under dry conditions. Dry conditions shall prevail until concrete has reached sufficient strength to withstand earth and hydrostatic loads and until the pipelines are properly jointed, tested and backfilled.

D. Pumping in excavations shall be done in such a manner so as to prevent damage to the existing subgrade, and to prevent the carrying away of unsolidified concrete materials.

E. Excavations shall be made sufficiently wide to permit proper installation of the respective materials. The depth of trench shall be sufficient to allow a minimum cover as shown on the drawings. All trenches shall be excavated at least 6 inches below the bottom of the utility or pipe and backfilled with pipe bedding material as specified in Section 312323 – Select Granular Materials.

F. Acceptable excavated materials shall be stockpiled in specified areas until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.
   1. Locate and retain soil materials away from edge of excavations.
   2. Unsuitable backfill material shall be kept separate from all other material and shall be disposed of as specified hereinafter. Disposal of unsuitable and excess excavated material shall be accomplished immediately upon removal from the excavation.
   3. Stockpiles shall not be located such that they interfere with traffic or access to public or private property. If necessary, the CONTRACTOR shall maintain additional stockpile areas located elsewhere on the site, and shall transport the suitable backfill material to and from such stockpile areas as required for the work.

G. If the material at the design grade is unsuitable as determined by the ENGINEER, the CONTRACTOR, when ordered in writing, shall excavate additional material to the depth necessary and shall backfill to the proposed grade with select granular material.

3.05 UNAUTHORIZED EXCAVATION

A. All excavation outside the lines and grades shown and not specified, together with the removal and disposal of the associated material shall be at the CONTRACTOR'S expense. The unauthorized excavation shall be filled as directed by the ENGINEER with select compacted backfill at the CONTRACTOR'S expense. Claims and damages resulting from the CONTRACTOR'S unauthorized excavation will be his sole responsibility.

3.06 DRAINAGE AND DEWATERING

A. General

1. Prevent surface and subsurface water from flowing into excavations and from flooding adjacent areas.
2. Remove water from excavation as fast as it collects.
3. Maintain the ground water level at least 2 feet below the bottom of the excavation to provide a stable surface for construction operations and to prevent damage to the work during all stages of construction.
4. Provide and maintain pumps, sumps, suction and discharge lines and other dewatering system components necessary to convey water away from excavations.
5. Provide sediment traps when water is conveyed into water courses.
6. Notify the ENGINEER before shutting down dewatering systems for any reason.
7. Standing water shall not be permitted in the excavation at any time. If the material at the design grade becomes unsuitable or contaminated due to the actions of the CONTRACTOR, the CONTRACTOR shall excavate additional material to the depth necessary and shall backfill to the proposed grade with select fill or crushed stone.
8. 100% stand-by pumps (gasoline powered) shall be maintained at the site at all times.
9. Any hardships created by the temporary dewatering for this Contract which adversely affects the water supply to local property owners, shall be satisfactorily resolved by the CONTRACTOR, including the provision of temporary water service, if required, at no additional cost to the OWNER.
10. Obtain required permits from agencies of jurisdiction, NYSDEC, and USACOE, for any water being discharged into rivers, streams, or water courses.

B. Disposal of Water Removed by Dewatering Systems

1. Dispose of all water removed from the excavation in such a manner as not to endanger public health, property, or any portion of the work under construction or completed.
2. Dispose of water in such a manner as to cause no inconvenience to the owner or others on or adjacent to the site.
3. Convey water from the excavation in a closed conduit. Do not use trench excavations as temporary drainage ditches.
4. Disposal of water shall be by specified methods and shall not cause erosion or sedimentation to occur in existing drainage systems. All sedimentation or blocking of existing systems shall be thoroughly cleaned and returned to original condition by the CONTRACTOR at his expense.
5. Damage caused by the CONTRACTOR'S operations to public or private property shall be repaired by him to the satisfaction of the ENGINEER and the damaged property owner at the CONTRACTOR'S expense.

6. The CONTRACTOR shall perform all work, furnish all materials and install all measures required to reasonably control soil erosion resulting from construction operations and prevent excessive flow of sediment from the construction site. Such work may include the installation of water diversion structures, diversion ditches and sediment basins and seeding, mulching or sodding critical areas to provide temporary protection. The CONTRACTOR shall submit a plan showing the methods to be used for controlling erosion and sedimentation during construction along with the schedule of construction operations to the ENGINEER for review.
7. All erosion and sediment control practices shall be in place prior to any grading operations and installation of proposed structures or utilities.
8. All erosion and sediment control practices shall be left in place until construction is completed and\or area is stabilized.
9. Where necessary, disturbed areas shall be temporarily seeded and\or mulched until proper weather conditions exist for establishment of a permanent vegetative cover.

3.07 SHEETING, SHORING, AND BRACING

A. General

1. Unless otherwise shown or specified, excavations shall be open, shored and braced or sheeted where necessary to prevent injury to workmen, structures, pipelines and utilities.
2. Structures within 100 feet of sheeting installations shall be subject to a pre-construction survey to identify and record existing structural conditions. In the instance of private residencies, the homeowners shall be contacted directly. These inspections shall be carried out by a pre-inspection firm experienced in this line of work.
3. During the actual construction process, the CONTRACTOR shall provide the monitoring and recording of the actual vibrations generated. A baseline of ambient vibration levels shall be established prior to driving sheet piling.
    a. The particle acceleration during the driving of the sheet piling shall not exceed 2.0 FPS.
    b. The CONTRACTOR will be required to change the construction methods if the work is resulting in unacceptable vibration levels.
4. All municipal, county, state, and federal ordinances, codes, regulations, and laws shall be observed. The CONTRACTOR shall provide all sheeting, shoring, and bracing which conforms to New York State Department of Labor – Industrial Code Note 23 and all applicable sections of the 1970 Occupational Safety and Health Act (OSHA), and any other requirements as necessary.
5. All municipal, county, state and federal ordinances, codes, regulations, laws and OSHA regulations shall be observed.

6. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down the shoring and bracing as excavation progresses.
7. Safe and satisfactory sheeting, shoring and bracing shall be the entire responsibility of the CONTRACTOR.
8. The CONTRACTOR shall be held accountable and responsible for the sufficiency of all shoring and bracing used and for all damage to persons or property resulting from the improper quality, strength, placing, maintaining or removing of the same.
9. The ENGINEER'S permission to proceed with work in either a sheeted, shored braced or open trench condition shall in no way relieve the CONTRACTOR from the above responsibilities.
10. The clearances and types of temporary structures, insofar as they affect the character of the finished work, and the design of steel sheeting to be left in place, will be subject to the review of the ENGINEER, but the CONTRACTOR shall be solely responsible for the adequacy of all sheeting, shoring, bracing, cofferdamming, etc.
11. Unless otherwise shown, specified, or ordered, all materials used for temporary construction shall be removed when work is completed. Such removal shall be made in a manner not injurious to the pipelines or structures.
12. All steel sheet piling designed to remain in place shall be new materials. New or used materials may be used for temporary work.
13. Steel sheet piling shall be manufactured from steel conforming to ASTM A328. Steel for soldier piles, wales, and braces shall be manufactured to conform to ASTM A36.

B. Removal of Sheeting and Bracing
1. Sheeting and bracing shall be removed from excavation unless otherwise indicated by the ENGINEER. Removal shall be done so as to not cause injury to the work.
   a. Wood or steel sheeting shall not be removed when adjacent to structures, pavement, pipes, or any other public or private property where removal may cause damage to such property.
   b. Fill all voids left by removal of sheeting with select fill.
2. Removal of sheet piling shall be done so as not to cause injury to the Work. Removal shall be equal on both sides of excavation to ensure no unequal loads on pipe or structures.

3.08 BACKFILL AND COMPACTION

A. All backfill required for trenches and structures required to provide the finished grades shown and as described herein shall be furnished, placed and compacted in 6 inch lifts by the CONTRACTOR. Unless otherwise specified or required, fill shall be obtained from the excavated materials. All materials used for filling and backfilling shall be soil of acceptable quality, free from boulders, frozen lumps,

wood, stumps, sludge, or other organic matter or other deleterious or hazardous materials. Excavated materials meeting these requirements and approved by the ENGINEER may be used as backfill.

B. Rock and/or earth material may be encountered during the work that is unsuitable for backfilling. When this material is encountered, it shall be disposed of in the specified manner, possibly resulting in a shortage of suitable backfill material. In this event, the CONTRACTOR shall be responsible for furnishing, delivering and installing clean earth or select backfill materials to properly and completely backfill the excavation. Backfill material for these situations may be obtained from other areas of the project where suitable material is available or from offsite locations as approved by the ENGINEER. All backfill material is subject to the ENGINEER'S review and must meet the minimum requirements of the specifications above.

C. Backfill excavations as promptly as work permits, but not until completion of the following:
   1. Inspection by the ENGINEER of all work within the excavation.
   2. Inspection, testing approval, and recording of locations of underground utilities, connections, branches, structures and other facilities.
   3. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in a manner to prevent settlement of the structure or utilities, or leave in place if required.
   4. Removal and proper disposal of trash and debris.

D. Excavation shall be kept dry during backfilling operations. Backfill around piping and structures shall be brought up evenly on all sides.

E. The minimum density to be obtained during backfilling operations shall be 95 percent and is a percentage of the maximum density obtained in the laboratory as defined in ASTM D698 Method C including Note 2. This percentage is of modified Proctor density. In-place density determinations shall be made using a sand density cone or equivalent method as specified by ASTM D1556. If any bricks, bottles, pieces of metal, debris or other foreign matter larger than $^{3}/_{4}$-inch size are encountered in the density test hole, a different test location shall be chosen. The ENGINEER will determine the frequency of field testing required to determine the density of the fill and shall direct the number and location of density tests. All equipment necessary to determine fill density, including nuclear density meters, shall be supplied by the CONTRACTOR.

F. The water content of fill material shall be controlled during placement within the range necessary to obtain the density specified. In general, the moisture content of the fill shall be within 5 percent dry and 2 percent wet of the optimum moisture content for the specified density as determined by laboratory tests. The CONTRACTOR shall perform all necessary work to adjust the water content of the

material to within the range necessary to permit the density specified. No fill material shall be placed and no compaction of fill will be permitted when there is any standing water in the trenches or when the fill material or the ground the fill is to be placed on is frozen.

G. The CONTRACTOR is not allowed to access any part of an existing water supply system (fire hydrants, etc.) as a source of water for any reason during construction activities, including the use of water for backfilling to obtain the proper moisture content.

H. If the specified densities are not obtained because of the CONTRACTOR'S improper control of placement or compaction procedures, or because of inadequate or improperly functioning equipment, the CONTRACTOR shall perform whatever work is required to provide the specified densities. This work shall include complete removal of unacceptable fill areas, replacement and recompaction until acceptable fill is provided.

I. All backfill in trenches shall be placed in horizontal layers not exceeding 6 inches in depth and thoroughly compacted before the next layer is placed.

J. Placement:
   1. Place pipe bedding, select backfill and/or earth backfill or borrow materials, as specified herein.
   2. Trenches under roadways shall be backfilled with select backfill material for the entire length of the open cut crossing plus 5 feet back from the edge of pavement or a distance equal to a 1 on 1 slope to the invert, whichever is greater.
   3. Where shoulders are excavated, the trench shall be backfilled with select granular material.
   4. The entire trench area under driveways, parking areas, and sidewalks, shall be backfilled with select granular material in accordance with the Contract Drawings and Specifications.
   5. Prior to commencing with the backfilling operation, the CONTRACTOR shall submit information to the ENGINEER such as catalog cuts, specification sheets, etc., describing the type of compaction equipment he intends to use.

K. Pipe Trench Preparation
   1. Braced trench width shall be minimized to greatest extent practical but shall conform to the following:
      a. Trench width shall be sufficient to provide room for installing, jointing and inspecting piping, as shown on Contract Drawings.
      b. Enlargements at pipe joints may be made if required and specified by the ENGINEER.

c. Trench width shall be sufficient for sheeting, bracing, sloping, and dewatering.
d. Trench width shall be sufficient to allow thorough compacting of backfill.
e. Do not use excavating equipment which requires the trench to be excavated to excessive width.

2. Depth of trench shall be as shown. If required, depths may be revised as specified by the ENGINEER.

L. The CONTRACTOR shall repair any settlement that occurs at no additional cost to the OWNER.

3.09 GRADING

A. General
Uniformly grade areas within limits of grading under this Section including adjacent transition areas. Smooth subgrade surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.

B. Turfed Areas
Finish areas to receive topsoil to within not more than 1 inch above or below the required subgrade elevation.

C. Walks and Pavements
Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than $^1/_2$ inch above or below the required subgrade elevation.

D. Slabs
Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 3 inch when tested with a 10 foot straightedge.

E. Compaction
After grading, compact subgrade surfaces to the depth and percentage of maximum density required.

F. All existing drainage swales and ditches, if disturbed, shall immediately, upon completion of pipe installation, be restored to proper lines and grades. CONTRACTOR shall ensure the final drainage facilities are in working condition and acceptable to the agency of jurisdiction.

3.10 PAVEMENT SUBBASE COURSE

A. General
Place subbase material, in layers of specified thickness, over ground surface to support the pavement base course.

B. Grade Control
During construction, maintain lines and grades including crown and cross-slope of subbase course.

C. Shoulders
Place shoulders along edges of subbase course to prevent lateral movement. Construct shoulders of acceptable soil materials as specified, placed in such quantity to compact to thickness of each subbase course layer. Compact and roll at least 12 inch width of shoulder simultaneously with compacting and rolling of each layer of subbase course.

D. Placing
Place subbase course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting subbase material during placement operations. When a compacted subbase course is shown to be 6 inches thick or less, place material in a single layer. When shown to be more than 6 inches thick, place material in equal layers, except no single layer more than 6 inches or less than 3 inches in thickness when compacted.

3.11 DISPOSAL OF EXCAVATED MATERIALS

A. Material removed from the excavations which does not conform to the requirements for fill or is in excess of that required for backfill shall be hauled away by the CONTRACTOR and disposed of in compliance with Municipal, County, State, Federal or other applicable regulations at no additional cost to the OWNER.

B. The CONTRACTOR shall not dispose waste excavated material in any of the following locations:
1. Wetland areas.
2. Flood plains.
3. Any area where excess siltation will damage or pollute receiving water.
4. Disposal of excess materials shall only be allowed at locations approved by NYSDEC Region 9.

3.12 RESTORATION AND CLEAN-UP

A. Following installation, the CONTRACTOR shall restore all areas to their original condition to the requirements of Section 310513.95 - Restoration, and to the satisfaction of the ENGINEER.

END OF SECTION

SECTION 330110.58

TESTING AND DISINFECTION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified
   1. Testing and disinfection of all pressure piping for leakage as specified.
      a. The CONTRACTOR shall furnish all labor, equipment, test connections, vents, water and materials necessary for carrying out the pressure and leakage tests as specified and required.
   2. The work specified shall include all labor, material, equipment, services and incidentals necessary to fill, clean, chlorinate, flush, and test all pipelines, which will carry or hold potable water.

B. Related Work Specified Elsewhere
   1. Section 330519 – Ductile Iron Pipe and Fittings
   2. Section 331418 – Valves and Appurtenances
   3. Section 331419.13 – Fire Hydrants
   4. Section 400506 – Piping and Specialties
   5. Section 432331 – Vertical Turbine Pumps

C. Description
   1. Permission shall be obtained from the OWNER of the water system before the use of water from any existing system. The CONTRACTOR shall:
      a. Conform to the requirements of the OWNER.
      b. Pay all costs connected with the taking or use of water for any retesting.
      c. The CONTRACTOR shall provide written notice to the OWNER and ENGINEER at least three working days in advance of testing and disinfection.
   2. All work under this section shall be performed in the presence of the ENGINEER. A representative of the public health authority having jurisdiction must also be present, as required.
   3. Chlorination shall be scheduled such that sampling and flushing will be performed during normal business hours.

1.02 QUALITY ASSURANCE

A. Reference Standards
   1. AWWA B300, Standard for Hypochlorites
   2. AWWA B301, Standard for Liquid Chlorine
   3. AWWA C104, Cement-Mortar Lining for Ductile Iron Pipe and Fittings for Water
   4. AWWA C502, Standard for Dry-Barrel Fire Hydrants
   5. AWWA C504, Standard for Rubber Seated Butterfly Valves

6. AWWA C600, Standard for Installation of Ductile Iron Watermains and Their Construction
7. AWWA C651, Standard for Disinfecting Water Mains
8. NSF/ANSI Standard 60 and 61 (as applicable)
9. Standard Methods for the Examination of Water and Wastewater, latest edition
10. 1996 Safe Drinking Water Act

1.03 SUBMITTALS

A. The CONTRACTOR shall submit proposed materials, methods, and operations regarding testing and disinfection to the ENGINEER for review prior to the start of testing.

B. CONTRACTOR must provide a sketch to the ENGINEER of the sampling locations identifying at minimum the following:
1. North arrow
2. Sampling locations
3. Other distinguishable landmarks
4. Any other information as requested by ENGINEER, OWNER, or County Health Department

C. The CONTRACTOR shall submit certification that all backflow preventers (Reduced Pressure Zone attachments) and pressure gauges have been tested and certified within the last year.

D. Qualifications of laboratory analyzing biological samples shall be New York State ELAP certified.

E. Chain-of-Custody forms are to be furnished for all biological samples taken.

F. For flushing operations, ENGINEER shall supply calculations identifying that a minimum 3.0 ft/sec scour velocity has been achieved in the new waterline and

A. that three pipe volumes have passed through it.

PART 2 - PRODUCTS

2.01 MATERIAL

A. All products must be suitable for use in a potable water system and NSF-60 certified. All piping, valves, etc. shall be NSF-61 certified.

B. Chlorination shall be by the use of a solution of sodium hypochlorite contained in the pipe or structure as specified. The use of calcium hypochlorite in powdered, granular, or tablet form, shall not be allowed.

PART 3 - EXECUTION

3.01 TESTS ON PRESSURE PIPING FOR POTABLE WATER

A. General

1. Flush and disinfect prior to connection to existing piping as specified below, except as otherwise authorized by the ENGINEER.
2. Notify the ENGINEER 72 hours in advance of testing.
3. 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.
4. Conduct all tests per AWWA C-600 and C-651, latest editions in the presence of the ENGINEER. Repeat tests in the presence of local authorities having jurisdiction if required by them.
5. Test pressure requirements: 150 psi on all potable water piping systems (fittings and valves), 85 psi on all sump and drain systems (fittings and valves), and 150 psi on all instrument water piping systems (fittings and valves).
6. CONTRACTOR shall have sufficient personnel at the site for the entire duration of all tests.
7. Provide outlets to flush line, expel air and perform specified tests.
8. Where connections to existing lines are called for only one such connection will be allowed.
9. All fittings 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.
10. The CONTRACTOR must supply all materials and manpower to perform the tests as specified herein.
11. Testing and disinfection shall be acceptable and approved by the agency of jurisdiction before another connection is made.

B. Initial Flushing

1. CONTRACTOR shall fill and flush new pipe to remove dirt and miscellaneous debris from the inside of the pipe.
2. CONTRACTOR is responsible for removing all entrapped air during flushing.
3. Flushing must have sufficient flowrate to achieve a fluid velocity of 3.0 feet per second inside the pipe.
4. A minimum 2-inch tap is required for proper flushing of all pipe having a diameter of 8 inches or less.
5. Refer to AWWA C651, for number of taps required to obtain the minimum 3.0 feet per second flow velocity in all pipes larger.
6. CONTRACTOR is responsible for providing a water source for flushing. With the permission of the OWNER/OPERATOR, an existing watermain may be used as a water source; however, the following restrictions apply:
   a. The CONTRACTOR is not allowed to operate any valves or hydrants or operate any components, which belong to the OWNER.

b. If water is drawn from the existing system, an appropriate backwater preventer such as a Reduced-Pressure Zone (RPZ) device must be used. The RPZ must be tested within one (1) year and approved prior to usage.

a. Water from flushing procedures must be disposed of properly. Water may be piped or gravity-fed to an existing storm sewer with the ENGINEER'S and the OWNER'S permission if proper erosion control methods to minimize sediment build-up are used. Discharge of water into a roadway or into a parking lot area is strictly prohibited. Water discharging operations shall not cause damage to any public or private property.

7. The CONTRACTOR shall ascertain from the OPERATOR whether the volume of water to be used dictates the need for metering to be performed and usage documented.

3.02 LEAKAGE TEST

A. Each valve and all flanged and/or restrained joints shall be deemed leak-free by the ENGINEER prior to acceptance.

3.03 DISINFECTION

A. Before disinfection, the line shall be cleaned and flushed with clean water as defined in the Initial Flushing section. CONTRACTOR shall provide outlets as required.

B. The placement of chlorine powder or tablets inside the pipe during installation as a means of disinfection will not be allowed.

C. When incorporating a new pump, valve, or pipe into the water system, those components shall be chlorinated by a concentrated chlorine solution containing between 200 mg/l and 300 mg/l of free chlorine. The solution shall be applied with a brush or sprayed on the entire inner surface of the empty pipes or structures. The surfaces disinfected shall remain in contact with the strong chlorine solution for at least 30 minutes.

D. Bacteriological testing shall be performed by certified testing laboratory retained and paid for by CONTRACTOR. Results of bacteriological testing shall indicate conformance with the Contract Documents and shall be acceptable to the Authority and Department of Health.

E. The proposed piping shall be tested in all respects, prior to connecting the second end of the pipe to the existing system and prior to installing the annular fill at casing pipes.

F. Chlorinated water from hydrants and taps must be properly collected and disposed of by the CONTRACTOR. Discharge of chlorinated water into the existing storm sewer or a natural water body shall not be allowed.

3.04 FINAL FLUSHING

A. After disinfection, the line shall be flushed with clean water as defined in Initial Flushing section.

B. The CONTRACTOR will be required to empty the contents of the pipe into a tank truck. Dumping into a sewer will only be allowed with approval from the local governing body. In no instance will chlorinated testing or flushing water be emptied onto the roadways, in ditches, culverts, streams, wetlands, or any other natural water body.

3.05 DISINFECTION OF HYDRAULIC STRUCTURES (TANK)

A. All interior surfaces of hydraulic structures shall be chlorinated and disinfected by CONTRACTOR in accordance with Method 2 in AWWA C652, and as accepted and approved by the Authority and Department of Health.

B. Disinfection:
   1. Provide temporary taps, plugs, valves, drains, pumps, tanks, piping, facilities, and connections required to disinfect, dechlorinate, and remove chlorinated water, as necessary.
   2. Disinfect hydraulic structures immediately before each structure is placed back into continuous operation to prevent facility from becoming contaminated after disinfection.
   3. Do not discharge chlorinated water onto roadways, into ditches, storm sewers, drainage culverts, streams, or wetlands.

C. After disinfection is completed and before hydraulic structure is placed in continuous service, CONTRACTOR shall coordinate and pay for testing the hydraulic structure's water for coliform bacteria and chlorine residual in accordance to the latest version of "Standard Methods for Examination of Water and Wastewater" and as approved by the OWNER, ENGINEER and local Department of Health.

D. Samples for bacteriological testing shall be obtained from each disinfected hydraulic structure in accordance with AWWA C652, the latest version of "Standard Methods for Examination of Water and Wastewater" and as approved by the OWNER, ENGINEER and local Department of Health.

E. Repeat the disinfection procedure at no additional cost to OWNER, including water use, until test results indicate satisfactory results and tank is approved by the Department of Health to be put back into continuous service.

END OF SECTION

SECTION 330517

COPPER PIPE

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

The work specified shall include all labor, materials, tools, equipment, services and incidentals necessary to furnish and install new copper pipe and fittings as shown, specified and required.

B. Related Work Specified Elsewhere

1. Section 330110.58 – Testing and Disinfection
2. Section 400506 – Piping Specialties and Accessories
3. Section 407326 – Pressure Transmitters and Switches

1.02 QUALITY ASSURANCE

A. Manufacturer's Qualifications

1. Manufacturer shall have a minimum of 5 years experience producing copper pipe, fittings and appurtenances, and shall show evidence of at least 5 installations in satisfactory operation.
2. Parts Interchangeability: It is the intent of these specifications that all materials furnished herein shall be compatible with similar materials of other manufacturers.

B. Reference Standards

1. ASTM B32, Specification for Solder Metal
2. ASTM B42, Specification for Standard Size Seamless Copper Pipe
3. ASTM B68, Specification for Bright Annealed Seamless Copper Tube
4. ASTM B75, Specification for Seamless Copper Tube
5. ASTM B88, Specification for Seamless Copper Water Tube
6. ASTM B302, Specification for Threadless Copper Pipe
7. ASTM B306, Specification for Copper Drainage Tube (DWV)
8. NSF/ANSI Standard 61
9. Underwriter's Laboratories (UL)
10. International Organization for Standardization (ISO)
11. Factory Mutual Research Corporation
12. National Fire Protection Association
13. ASME, Boiler and Pressure Vessel Code
14. Federal Specification WW-P-377D(1), Pipe, Copper, Seamless Standard Sizes (S/S by ASTM B42)

15. ANSI B16.22, Wrought Copper and Bronze Solder - Joint Pressure Fittings
16. 1996 Safe Drinking Water Act

1.03 SUBMITTALS

A. Shop Drawings: Submit for approval the following:
   1. Detailed drawings and data on pipe, fittings and accessories.
   2. A materials list, which shall include full information regarding all components of the equipment. Materials of construction shall be presented in the listing.
   3. Any operations and maintenance information for copper pipe.

B. Submit certificates of compliance with the applicable referenced standards.

C. Submit certificate of compliance with NSF/ANSI Standard 61 for all products under this section, including interior coatings, by an independent, authorized laboratory.

D. Furnish delivery tickets indicating the pipe manufacturer, pipe type and class, identifying that the pipe was new and from a manufacturer that has been submitted and approved.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. During delivery and handling, all materials shall be braced and protected from any distortion or damage; any such distortion or damage shall be basis for rejection of the materials.

B. The materials shall be inspected before unloading. Materials that are found to be cracked, gouged, chipped, dented, or otherwise damaged will not be accepted.

C. Interiors of pipe, fittings and appurtenances shall be kept free from dirt and foreign matter.

D. Store pipe and fittings so they are not in contact with the ground.

PART 2 - PRODUCTS

2.01 MATERIALS

A. All products, including interior coatings, shall be suitable for use in a potable water system.

B. All products, including wetted parts, shall be certified to meet NSF/ANSI Standard 61.

C. All piping and fittings shall be designed for a working pressure and field hydrostatic test pressure as shown on the table as shown on the Drawings.

D. Copper pipe: Copper pipe shall conform to the requirements of ASTM B88 and Federal Specification WW-T-799a. Buried copper piping to maximum 2-inch diameter shall be type K, soft temper, suitable for use with flared fittings. Exposed copper piping shall be Type L hard temper tubing. Fittings shall conform to ANSI B16.22.

E. All copper piping and accessories must be new materials in first-class condition. Used or recycled materials will not be allowed, regardless of condition.

2.02 MARKING

A. All items shall be marked or labeled with the following information:
   1. Metal or alloy designation.
   2. Temper.
   3. Size and schedule.
   4. ASTM specification number.
   5. Name and location of supplier.

2.03 JOINTING

A. All joints shall conform to manufacturer's recommendations and shall be made by skilled workmen.

B. Joints shall develop full strength and shall be stronger than the pipe joined.

PART 3 - EXECUTION

3.01 GENERAL

A. All connections to copper piping shall be watertight at operating pressure.

B. Copper Tubing
   1. Copper tubing shall be installed in accordance with the applicable provisions of Section 312333, Excavation, Backfill and Trenching.
      a. Flared connections shall only be allowed for all buried fittings.
      b. No coupling shall be allowed, especially under paved areas. Exception shall be based on the length of the service and the size of the coil of tubing provided and shall be only as allowed by ENGINEER.
      c. Installation shall be suitable for open-cut or push or drill methods.

2. Exposed copper tubing shall be carefully erected and neatly arranged.
   a. Copper tubing shall be run parallel with walls inside structures and shall be pitched to drain.
   b. Drain valves shall be installed at the low points of liquid filled systems.
   c. Joints shall be soldered suitable for the pressure intended.
3. Unions shall be provided on copper tubing systems with soldered joints.
   a. Unions shall be located at control valves, solenoid valves, moisture and steam traps, other items of connected equipment and as shown on the Drawings.
   b. Unions shall be of cast bronze or brass construction.
   c. Dielectric unions shall be used when connecting copper tubing to ferrous metals.

END OF SECTION

SECTION 330519

DUCTILE IRON PIPE, FITTINGS AND ACCESSORIES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

B. The work specified shall include all labor, material, equipment, tools, services and incidentals necessary to furnish and install ductile iron pipe, fittings and appurtenances as shown, specified and required.

C. Related Work Specified Elsewhere
1. Section 330110.58 - Testing and Disinfection
2. Section 331418 - Valves and Appurtenances
3. Section 331419.13 - Fire Hydrants
4. Section 400506 - Piping Specialties and Accessories

1.02 QUALITY ASSURANCE

A. Materials in Contact with Potable Water: Certified according to NSF 61 and NSF 372.

B. Perform Work according to Erie County Water Authority standards.

C. Manufacturer Qualifications
1. Manufacturer shall have a minimum of 5 years experience producing ductile iron pipe, fittings and accessories, and shall show evidence of at least 5 installations in satisfactory operation.
2. Parts Interchangeability: It is the intent of these specifications that all materials furnished herein shall be compatible with similar materials of other manufacturers.

D. Reference Standards
1. AWWA C104, American National Standard for Cement-Mortar Lining for Ductile Iron Pipe and Fittings for Water
2. AWWA C110, American National Standard for Ductile-Iron and Gray-Iron Fittings, 3-inch through 48-inch, (75 mm through 1200 mm), for Water and Other Liquids
3. AWWA C111, American National Standard for Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings
4. AWWA C115, American National Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges

5. AWWA C150, American National Standard for Thickness Design of Ductile-Iron Pipe
6. AWWA C151, American National Standard for Ductile Iron Pipe, Centrifugally Cast, for Water
7. AWWA C153, American National Standard for Ductile-Iron Compact Fittings. 3 In. Through 24 In. (76 mm through 610 mm) and 54 In. Through 64 In. (1400 mm through 1600 mm), for Water Service
8. ANSI B16.1, Cast Iron Pipe Flanges and Flanged Fittings
9. ANSI B1.20, Pipe, Threads, General Purpose (Inch)
10. ANSI B18.2.1, Square and Hex Bolts and Screws Inch Series, Including Hex Cap Screws and Lag Screws
11. ANSI B18.2.2, Square and Hex Nuts
12. ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
13. ASTM A354, Specification for Quenched and Tapered Alloy Steel Bolts, Studs and Other Externally Threaded Fasteners
14. ASTM A536 Standard Specification for Ductile Iron Castings
15. NSF/ANSI Standard 61
16. Underwriter's Laboratories (UL)
17. International Organization for Standardization (ISO)
18. Factory Mutual Research Corporation
19. 1996 Safe Drinking Water Act

1.03 SUBMITTALS

A. Shop Drawings: Submit for approval the following:
   1. Detailed drawings and data on pipe, fittings and accessories.
   2. A materials list, which shall include full information regarding all components of the equipment. Materials of construction shall be presented in the listing.

B. Laying Schedules or drawings when requested or required or when custom pieces or specially marked pipe is used. Field closures and field cuts, and manner of restrained joints shall be shown.

C. Submit certificates of compliance with the applicable referenced standards.

D. Submit certificate of compliance with NSF/ANSI Standard 61 for all products under this section, including interior coatings, by an independent, authorized laboratory.

E. Furnish delivery tickets indicating the pipe manufacturer, pipe type and class, identifying that the pipe was new and from a manufacturer that has been submitted and approved.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. During delivery and handling, all materials shall be braced and protected from any distortion or damage; any such distortion or damage shall be basis for rejection of the materials.

B. Equipment used for unloading shall be covered with wood or rubber to avoid damage to the exterior of the pipe, fittings and accessories. Furthermore, all ductile iron pipe requiring polyethylene encasement as per Section 2.02.B, where the polyethylene has been field pre-applied to the pipe shall be handled with suitably padded equipment to prevent damage to the coating. Do not drop or roll materials off trucks. 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.

C. The materials shall be inspected before and after unloading. Materials that are found to be cracked, gouged, chipped, dented or otherwise damaged will not be accepted.

D. Interiors of pipe, fittings and accessories shall be kept free from dirt and foreign matter.

E. Store pipe and fittings on heavy wood blocking or platforms so they are not in contact with the ground.

F. Pipe, fittings, and specials shall be unloaded opposite to or as close to the place where they are to be used as is practical to avoid unnecessary handling.

1.05 EXISTING CONDITIONS

A. Field Measurements:
   1. Verify field measurements prior to fabrication.
   2. Indicate field measurements on Shop Drawings.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General
   1. All products, including interior coatings shall be suitable for use in a potable water system.
   2. All products, including wetted parts, shall be certified to meet NSF/ANSI Standard 61.
   3. All ductile iron pipe, fittings and accessories shall be designed for a working pressure and field hydrostatic test pressure as shown in the Drawings.
   4. All ductile iron pipe, fittings, and accessories must be new materials in first-class condition. Used or recycled materials shall not be allowed, regardless of condition.

5. All ductile iron pipe shall be provided from the same manufacturer.
6. Pipe shall be fully gauged.
7. Pipe and fittings shall be lined with cement mortar lining in accordance with AWWA C104 meeting NSF/ANSI Standard 61. Fittings may be lined with an NSF/ANSI Standard 61 approved fusion bonded epoxy meeting the applicable sections of AWWA C116.

B. Piping:
1. Ductile Iron Flanged Pipe and Fittings
   a. Ductile Iron Pipe with Threaded Flanges:
      1) Pipe shall be centrifugally cast ductile iron conforming to the requirements of AWWA C151 and C115 for material, dimensions, tolerance, tests, markings, and other requirements.
      2) Pipe barrels and flanges shall have a taper pipe thread (NPT) in accordance with ANSI B1.20.1, with pipe diameters adapted to ductile iron pipe standard outside diameters.
      3) Flanged pipe shall be minimum Class 53 thickness and shall be furnished in standard laying lengths as specified or required.
      4) Manufacturer:
         a) American Cast Iron Pipe Co.,
         b) Clow - A Division of McWane, Inc.,
         c) US Pipe,
         d) Fast Fabricators, Inc.
2. Ductile Iron Flanged Fittings:
   a. Tees, bends, elbows, reducers, increasers and other such fittings shall be flanged ductile iron in accordance with the requirements of AWWA C110 and shall conform to ANSI A21.10, 250 psi rating.
   b. Reducers shall be eccentric unless otherwise specified.
   c. Manufacturer:
      1) American Cast Iron Pipe Co.,
      2) Clow - A Division of McWane, Inc.,
      3) Griffin,
      4) Sigma Corp,
      5) Tyler - A Division of McWane, Inc.,
      6) Union Foundry Co., A Division of McWane, Inc.
      7) US Pipe.
3. Joints for Ductile Iron Flanged Pipe and Fittings:
   a. Flanged joints shall conform to the requirements of AWWA C110 and drilling and facing of flanges shall be in accordance with ANSI B16.1 Class 125 flanges unless otherwise specified.
   b. Flanged ductile iron pipe and fittings shall be furnished complete with all necessary joint accessories consisting of natural or synthetic rubber gaskets, 1/8-inch thick, full face; and, nuts, bolts and washers, unless otherwise specified.

c. All nuts, bolts and washers for flanges and accessories shall conform to ANSI B18.2.1 and ANSI B18.2.2, respectively and shall be Type 304 stainless steel, high strength, low alloy steel or fluorocarbon coated as specified herein.

C. Accessories

1. Flange Fillers, Blind Flanges and Reducing Companion Flanges:
   a. Conform to the requirements of AWWA C115 for material, dimensions, tolerance, tests, markings and other requirements.
   b. Drilling and facing of flanges shall be in accordance with ANSI B16.1, Class 125 flanges unless otherwise specified.
   c. Flanged fillers, blind flanges and reducing companion flanges shall be furnished complete with all necessary joint accessories consisting of natural or synthetic rubber gaskets, $^{1}/_{8}$-inch thick, full face; and, nuts, bolts and washers, unless otherwise specified.
   d. Threaded outlets or taps, (Mueller threads), shall be provided in blind flanges as specified or required.
   e. All nuts, bolts and washers for flanges and accessories shall conform to ANSI B18.2.1 and ANSI B18.2.2, respectively and shall be Type 304 stainless steel, high strength, low alloy steel.
2. Manufacturer
   a. American Cast Iron Pipe Co.,
   b. Clow - A Division of McWane, Inc.,
   c. Griffin,
   d. Sigma Corp.,
   e. Star Pipe Products,
   f. Tyler - A Division of McWane, Inc.,
   g. US Pipe.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that field dimensions are as indicated.

B. Inspect existing flanges for nonstandard bolt hole configurations or design, and verify that new pipe and flange mate properly.

3.02 PREPARATION

A. Surface Preparation:
1. Clean surfaces to remove loose rust, mill scale, and other foreign substances by power wire brushing.
2. Touch up shop-primed surfaces with primer as specified in Section 099000 - Painting and Coating.
3. Solvent-clean surfaces that are not shop primed.

3.03 INSTALLATION

A. Exposed Service Piping:
   1. According to ASME B31.3.
   2. Run piping straight along alignment as indicated, with minimum number of joints.

B. Fittings:
   1. According to manufacturer instructions.
   2. Provide required upstream and downstream clearances from devices as indicated.

C. Make taps to ductile iron piping only with service saddle, tapping boss of a fitting or valve body, or equipment casting.

D. Install piping with sufficient slopes for venting or draining liquids and condensate to low points.

E. Disinfection: Disinfect potable water piping as specified in Section 330110.58 - Testing and Disinfection

F. Dielectric Fittings: Provide between dissimilar metals.

G. Field Cuts: According to pipe manufacturer instructions.

H. Finish primed surfaces according to Section 099000 - Painting and Coating.

3.04 FIELD QUALITY CONTROL

A. Inspection:
   1. Inspect for damage to pipe lining or coating and for other defects that may be detrimental as determined by Architect/Engineer.
   2. Repair damaged piping or provide new, undamaged pipe.
   3. After installation, inspect for proper supports and interferences.

END OF SECTION

SECTION 331418

VALVE AND APPURTENANCES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified
   1. The work specified shall include all labor, material, equipment, services, and incidentals necessary to furnish and install valves and appurtenances as shown, specified, and required.
   2. This section defines the minimum requirements for all types of valves required for buried, exposed, submerged, and other types of piping, except where otherwise specifically included in other Sections.

B. Related Work Specified Elsewhere
   1. Section 330110.58 – Testing and Disinfection
   2. Section 330519 – Ductile Iron Pipe, Fittings, and Accessories

1.02 QUALITY ASSURANCE

A. Manufacturer's Qualifications
   1. Manufacturer shall have a minimum of 5 years' experience producing valves and appurtenances, and shall show evidence of at least five installations in satisfactory operation.
   2. Linestop installer shall have a minimum of 10 years' experience completing tapping on PCCP mains, and shall show evidence of similar experience information to include, but not limited to, work location, pipe information, and field personnel.
   3. Parts Interchangeability: It is the intent of these specifications that all materials furnished herein shall be compatible with similar materials of other manufacturer's.

B. Reference Standards
   1. ANSI B16.1, Cast Iron Pipe Flanges and Flanged Fittings
   2. ANSI B16.4, Cast Iron Fittings
   3. ASTM A48, Standard Specification for Gray Iron Castings
   4. ASTM A126, Standard Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings
   5. ASTM A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
   6. ASTM A354, Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs and Other Externally Threaded Fasteners
   7. ASTM A436, Standard Specification for Austenitic Gray Iron Castings
   8. ASTM A536, Standard Specification for Ductile Iron Castings
   9. ASTM B62, Standard Specification for Composition Bronze or Ounce Metal Castings

10. AWWA C-111 for mechanical joint ends
11. AWWA C500, Standard for Metal-Seated Gate Valves for Water Supply Service
12. AWWA C504, Standard for Rubber-Seated Butterfly Valves
13. AWWA C508, Standard for Swing Check Valves for Waterworks Service, 2-inch (50 mm) through 24-inch (600 mm) NPS
14. AWWA C509, Standard for Resilient Seated Gate Valves for Water Supply Service
15. AWWA C800, Underground Service Line Valves and Fittings
16. American Gear Manufacturers Association (AGMA) Standards
17. NEMA, National Electrical Manufacturer's Association
18. NEC, National Electrical Code
19. NSF/ANSI Standard 61
20. Underwriter's Laboratories (UL)
21. International Organization for Standardization (ISO)
22. Factory Mutual Research Corporation
23. 1996 Safe Drinking Water Act
24. Manufacturing Standardization Society of the Value and Fittings Industry (MSS)

1.03 SUBMITTALS

A. Shop Drawings: Submit for approval the following:
   1. Manufacturer's literature, illustrations, specifications, detailed drawings, data and descriptive literature on all valves and appurtenances.
   2. Deviations from Drawings and Specifications.
   3. Engineering data including dimensions, materials, size, operator orientation, and weight.
   4. Fabrication, assembly, installation and wiring diagrams.
   5. Linestop valve information shall include but not limited to: pipe taps/sleeves, drilling apparatus, linestops, tapping valves, surface coatings, installation and testing instructions, and all other equipment and materials necessary to complete the work.

B. Operation and Maintenance Data: Submit complete manuals including:
   1. Copies of all Shop Drawings, test reports, maintenance data and schedules, description of operation, and spare parts information.

C. Shop Tests: Submit for approval the following:
   1. Hydrostatic tests for each valve when required by the valve specifications included herein.
   2. Each gate valve shall have the leakage test required by Section 5 of AWWA C509 performed with the pressure differential applied in both directions.
   3. The manufacturer of butterfly valves shall submit certified copies of reports covering the bi-directional leakage tests in accordance with Section 6, AWWA C504.

D. Certificates:
   1. Where specified or otherwise required by ENGINEER, submit test certificates.
   2. The CONTRACTOR shall submit certificates of compliance with the applicable referenced standards.
   3. Submit certificate of compliance with NSF/ANSI Standard 61 for all products under this section, including interior coatings, by an independent, authorized laboratory.

E. Delivery Tickets:
   1. Furnish delivery tickets indicating the valve manufacturer, valve type and class, identifying that the valves are new and from a manufacturer that has been submitted and approved.

F. Testing Criteria:
   1. CONTRACTOR must provide manufacturer's test specifications for all tapping sleeve and valves prior to field testing.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. During delivery and handling, all materials shall be braced and protected from any distortion or damage; any such distortion or damage shall be basis for rejection of the materials.

B. Equipment used for unloading shall be covered with wood or rubber to avoid damage to the exterior of the valves and accessories. Do not drop or roll materials off trucks. All valves and appurtenances shall be handled with padded slings or other appropriate equipment. The use of cables, hooks or chains will not be permitted.

C. The materials shall be inspected before and after unloading. Materials that are found to be cracked, gouged, chipped, dented or otherwise damaged will not be accepted.

D. Interiors of valves and appurtenances shall be kept free from dirt and foreign matter.

E. Store valves and appurtenances on heavy wood blocking or platforms so they are not in contact with the ground.

F. Valves and appurtenances shall be unloaded opposite to or as close to the place where they are to be used as is practical to avoid unnecessary handling.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General
   1. All products, including interior coatings, shall be suitable for use in a potable water system.

2. All products, including wetted parts, shall be certified to meet NSF/ANSI Standard 61.
3. Valves shall have manufacturer's name and working pressure cast in raised letters on valve body. Valves shall be suitable for test pressures.
4. Manual valve operators shall turn clockwise to close unless otherwise specified. Valves shall indicate the direction of operation.
5. Valve shall be treated as a bulkhead (dead end) condition and pipe joints shall be restrained on both sides of the valve for the lengths as shown, specified, or required.
6. All valves, operators, and appurtenances shall be designed to withstand the working and hydrostatic test pressures as specified.
7. Unless otherwise specified all flanged valves shall have ends conforming to ANSI B16.1, Class 125.
8. All bolts, nuts and studs shall, unless otherwise approved, shall conform to ASTM A307, Grade B; or ASTM A354. All bolts, nuts, and studs on or required to connect submerged or buried valves shall be fluorocarbon coated.
9. Bolts and nuts shall have hexagon heads and nuts.
10. Gasket material and installation shall conform to manufacturer's recommendations.
11. Identification: Identify each valve 4 inches and larger with a brass or stainless steel nameplate stamped with the approved designation. Nameplate shall be permanently fastened to valve body at the factory. Stenciled designations are acceptable for buried valves.
12. All valves and appurtenances must be new materials in first-class condition. Used or recycled materials will not be allowed, regardless of condition.

B. Butterfly Valves
   1. Butterfly Valve - General
      a. Butterfly valves shall be manufactured in accordance with the latest revision of AWWA C504, Class 150B and conform to NSF Standard 61. Valves shall have flanged ends for exposed installations and mechanical joints for buried installations.
      b. Valves for buried applications shall have mechanical joint ends and be restrained per Section 15106.
      c. Valve bodies shall be constructed of ASTM A126, Class B cast iron for flanged valves or ASTM A48, Class 40 for wafer style. Flanged valves shall be fully faced and drilled in accordance with ANSI Standard B16.1, Class 125, and match existing.
      d. Valves shall have Rubber body seats and shall be of one piece construction, simultaneously molded and bonded into a recessed cavity in the valve body. Seats may not be located on the disc or be retained by segments and/or screws.
      e. Valve bearings shall be of a self-lubricating, nonmetallic material to effectively isolate the disc-shaft assembly from the valve body. Metal-to-metal thrust bearings in the flow stream are not allowed. Valve bearing load shall not exceed 1/5 of the compressible strength of the bearing or shaft material.

f. The disc shall be a lens-shaped Class B cast iron disc with a stainless steel type 316 edge with demonstrated test results of 100,000 cycles of drip tight capability.

g. Discs shall be retained by stainless steel pins which extend through the full diameter of the shaft.

h. Valve shafts shall be of stainless steel type 304 and solid one piece design for valve sizes 3" through 20" and stub shaft design for valves larger than 24" in diameter with an adjustable thrust bearing to center the valve disc. At the operator end of the valve shaft, a shaft seal utilizing "V" type chevron packing shall be utilized. "O" ring and/or "u" cup packing is not allowed.

i. Valve bearings shall be as specified in Sect. 3, AWWA C504. The shaft bearings shall be Teflon or Teflon lined/fiberglass backed.

j. All surfaces of the valve interior shall be clean, dry and free from grease before painting. The valve interior and exterior, except for disc edge, rubber seat and finished portions shall be evenly coated with an NSF61 approved 2-part liquid epoxy. Minimum dry film thickness shall be 8 Mils minimum.

k. Identification: Identify each valve with a brass or stainless steel nameplate stamped with the approved designation. Nameplate shall be permanently fastened to valve body at the factory.

l. All butterfly valves and their operators shall be for suitable for exposed service and shall open counterclockwise.

m. All other bolts, nuts, and studs shall, unless otherwise approved, be fluorocarbon coated. Bolts and nuts shall have hexagon heads and nuts.

2. Operators

a. Operators shall be permanently lubricated and totally enclosed and be provided with a handwheel, chainwheel or 2-inch square nut, for manual valves or electric actuators for motorized valves as indicated on the contract drawings.

b. Operators shall turn clockwise to close the valve.

c. Operators shall be equipped with a totally enclosed permanently lubricated lever-traveling nut drive, self-locking type and shall be designed to hold the valve in any intermediate position between "fully open" and "fully closed" without creeping or fluttering.

d. Operators shall be equipped with adjustable stop-limiting devices to prevent over travel of the disc in the open and closed positions. Stops shall be located within the operator housing and be capable of adsorbing the full operator torque with minimum safety factor of 5.

e. Operator housing, supports and connections to the valve shall have provisions for four-bolt mounting.

f. Operator components shall withstand an input torque of 450 footpounds at the extreme operator positions without damage.

g. Enclosed lever-traveling nut operators shall have a gear ratio designed not to exceed 80 pounds pull to meet the required operator torque.

h. Extension stems shall not be allowed. All valves shall be located such that the cover over the top of the operating nut shall not exceed 5-foot in depth.

3. Manufacturer:
   a. Henry Pratt Co.
   b. DEZurik.
   c. Crispin.
   d. Or approved equal.

C. STAINLESS STEEL BODY BALL VALVES
   a. Manufacturers:
      1) Nibco
      2) Substitutions: Section 012513 – Substitution Procedures.
   b. Smaller than 4 inches:
      1) MSS SP 110.
      2) Minimum Working Pressure: 150 psig.
      3) Maximum Fluid Temperature: 200 degrees F as indicated on valve schedule.
      4) One-piece bronze stainless steel body.
      5) Stainless-steel ball.
      6) Full port, PTFE seats.
      7) Blow-out-proof stem.
      8) End Connections: Threaded.
      9) Operator: Hand lever.
      10) Finishes: As specified in Section 400523 - Common Work Results for Process Valves.

D. Swing Check Valves – Pump Discharge
   1. Manufacturer:
      a. ValMatic, Model SurgeBuster Check Valve.
      b. Dezurik, APCO-CRF100.
      c. Henry Pratt, PSI Surge Inhibitor.
      d. Or approved equal.
   2. The valve shall swing open smoothly at pump start and close quickly and quietly upon pump shutdown to prevent flow reversal. When closed, the valve shall seat drop tight. The valve shall be appropriate for installation in both the horizontal and vertical positions. The valve shall be tight seating. Valve shall have a disc accelerator and position indicator.
   3. Check valve shall be of the flanged, full body type with a domed access cover and no internal moving parts except for the flexible disc and disc accelerator. The flanged ends shall be manufactured in accordance with ANSI B16.1 Class 125. Valves shall be rated to 250 psi for all sizes.
   4. The valve body shall be constructed of ductile iron ASTM A-536 Grade 65-45-12 with flow area equal to the nominal pipe inside diameter throughout the valve. Seat shall be constructed on a 45 degree angle to reduce disc travel. The seat and internal body shall be fully coated with a two part thermosetting epoxy suitable for use in potable water applications. A threaded port with pipe plug shall be provided on the bottom of the valve to

allow for field installation of a backflow actuator or oil cushion device without special tools or removing the valve from the line.

5. The top access port shall be full size, allowing removal of the disc without removing the valve from the line. The access cover shall be domed in shape to provide flushing action over the disc for operating in lines containing high solids content. A threaded port with pipe plug shall be provided in the access cover to allow for field installation of a mechanical, disc position indicator.
6. The disc shall be of one-piece construction, precision molded with an integral O-ring type sealing surface and reinforced with alloy steel. The flex portion of the disc contains nylon reinforcement and shall be warranted for twenty-five years. Non-Slam closing characteristics shall be provided through a short 35 degree disc stroke and a disc accelerator to provide a cracking pressure of 0.3 psig.
7. The disc accelerator shall be of one piece construction and provide rapid closure of the valve in high head applications. The disc accelerator shall be enclosed within the valve and shall be field adjustable and replaceable without removal of the valve from the line. The disc accelerator shall be securely held in place captured between the cover and disc. It shall be formed with a large radius to allow smooth movement over the disc surface.
8. The valve disc shall be cycle tested 1,000,000 times in accordance with ANSI/AWWA C508 and show no signs of wear, cracking, or distortion to the valve disc or seat and shall remain drop tight at both high and low pressures.
9. The valve shall have a replaceable stainless steel body seat.
10. The disc shall be precision molded Buna-N (NBR), ASTM D2000-BG. Optional disc material includes Viton, EPDM, Hypalon. The Disc Accelerator shall be Type 302 Stainless Steel.
11. Pump discharge check valves shall have a position indicator and connection to OWNERS SCADA system.

E. Surge Relief Valves

1. The relief valve shall be globe (inline) body with flanged end connections, be fully mounted, external pilot operated, with free floating piston (operated without springs, diaphragm or levers).
2. It shall contain a single full-ported seat, with seat bore equal to size of valve. The minimum travel of the piston shall be equal to 25% of the diameter of the seat.
3. The piston shall be cushioned to insure positive closure.
4. The main valve diaphragm shall be (packed with) rubber, leather material is not acceptable.
5. The valve shall be furnished with an indicator rod to show position of piston opening, and pet-cocks for attachment to valve body for receiving gauges for testing purposes.
6. The pilot valve, controlling operation of the main valve, shall have a range of adjustment, be easily accessible, and arranged to allow for easy removal from the main valve while the main valve is under pressure.

7. The pilot valve, speed control valve, external strainer with blow-off, isolation valves, and all associated rigid brass piping, and fittings (with the exception of a separate static pressure sensing line, if required) shall be factory assembled and furnished with the valve.
8. Valve body and cap(s) shall be constructed of gray iron castings that conform to ASTM Specification A 126 Class B. Internal bronze components shall conform to ASTM Specification B-584. Internal Stainless Steel components shall conform to ASTM Specification A-743 Grade CF-8 or CF-8M.
9. Pilot valve seats shall be stainless steel.
10. The control piping shall be rigid red brass, no less than 0.5-inch diameter.
11. Ferrous surfaces of the valve shall be coated with NSF Certified epoxy in accordance with ANSI/NSF Std. 61.
12. Manufacturer:
    a. GA Industries, Figure 6700 (globe).
    b. CLA-VAL, Model 50-01 BPVY.
    c. Or Approved Equal.

F. Air Release Valves
1. Air release valves shall be designed to operate automatically under pressure to release entrapped air from a watermain, pump, tank, or water system. Once the air has been released, the valve shall close and remain closed until reopened by entrapped air. No leakage or process fluid will be permitted.
2. All internal valve components shallb e stainless steel.
3. The air release valve shall be float operated and shall incorporate a compound lever mechanism to enable the valve to automatically release accumulated air from a fluid system that system is pressurized and operating.
4. The air release valve shall close drop tight, incorporating an adjustable Buna-N orfice button.
5. The float shall be stainless steel and be capable of withstanding a test pressure of 300 psi.
6. The linkage/lever mechanism shall be able to be removed from the valve without disassembly of the mechanism, and shall be designed to prevent jamming.
7. The body and cover shall be cast iron conforming to the requirements of ASTM A126 Class B, and shall be designed to withstand a test pressure of 450 psig.
8. Manufacturer:
    a. ValMatic, model #38,
    b. Or approved equal.

G. Combination Air and Vacuum Release Valves
1. Combination air release valves shall be designed to relive entrapped air and to break a siphon in a pipeline regardless of flow direction.
2. All internal valve components shall be corrosion-resistant.

3. Manufacturer:
   a. ValMatic, valve #201C.2,
   b. Or approved equal.

2.02 PAINTING

A. Shop Painting
   1. Clean and prime coat ferrous metal surfaces.
   2. All interior wetted ferrous surfaces of valves and appurtenances except finished or bearing surfaces shall be shop-painted with an approved epoxy paint system certified to NSF/ANSI Standard 61 for potable water and applied in accordance with the paint system manufacturer's recommendations.
   3. Coat machined, polished and non-ferrous surfaces including gears, bearing surfaces and similar unpainted surfaces with corrosion prevention compound listed in NSF/ANSI Standard 61 and applied in accordance with the manufacturer's recommendations. Maintain coating during storage and until equipment begins operation.

PART 3 - EXECUTION

3.01 INSPECTION AND PREPARATION

A. During installation of all valves and appurtenances, the CONTRACTOR shall verify that all items are clean and free of defects in material and workmanship and function properly.

B. All valves shall be closed and kept closed until otherwise directed by the ENGINEER.

3.02 INSTALLATION

A. Install valves and appurtenances as shown on the Drawings and in accordance with the manufacturer's recommendations.

B. All valves shall be kept in the closed position until otherwise directed by the ENGINEER. Hydrant valves shall be opened during the hydrostatic testing and then closed until the watermain is placed into service.

C. Install all valves so that handwheels, levers, or wrenches can be conveniently turned from operating area and as approved by the ENGINEER.

D. Install all valves plumb and level unless otherwise approved. Valves shall be installed free from distortion and strain caused by misaligned piping/equipment or other causes.

E. CONTRACTOR shall operate each valve full open to full close in the presence of ENGINEER. The number of turns shall be recorded and provided to OWNER with the Record Drawings.

F. Valve extended bonnets shall be set plumb and centered with the bodies directly over the valves. Earth fill shall be carefully tamped around each valve bonnet extension to a distance of 4 feet on all sides, or to the undisturbed trench face, if less than 4 feet.

3.03 FIELD TESTS AND ADJUSTMENTS

A. Adjust all parts and components as required to provide correct operation.

B. Conduct functional field-test of each complete valve assembly in the presence of the ENGINEER to demonstrate that each part and all components together function correctly. All testing equipment required shall be provided.

3.04 VALVE SCHEDULE

A. Refer to the Contract Drawings for locations and valve schedule.

END OF SECTION

SECTION 331419.13

FIRE HYDRANTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified
The work specified shall include all labor, material, equipment, tools, services and incidentals necessary to furnish and install hydrants and valve assemblies as shown, specified and required.

B. Related Work Specified Elsewhere
1. Section 312323 - Select Granular Materials
2. Section 312333 - Excavation, Backfill and Trenching
3. Section 330110.58 - Testing and Disinfection
4. Section 330519 - Ductile Iron Pipe, Fittings and Accessories
5. Section 331418 - Valves and Appurtenances

1.02 QUALITY ASSURANCE

A. Manufacturer's Qualifications
1. Manufacturer shall have a minimum of 5 years experience producing fire hydrants and shall show evidence of at least 5 installations in satisfactory operation.

B. Parts Interchangeability
1. Hydrants and appurtenances provided under this Section shall be the standard product in regular production by manufacturers whose products have proven reliable in similar service for at least five years.
2. Parts Interchangeability: It is the intent of these specifications that all materials furnished herein shall be compatible with similar materials of other manufacturers.

C. Reference Standards
1. ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
2. ASTM A354, Specification for Quenched and Tapered Alloy Steel Bolts, Studs, and Externally Threaded Fasteners
3. AWWA C502, Standard for Dry-Barrel Fire Hydrants
4. NSF/ANSI Standard 61
5. Underwriter's Laboratories (UL)
6. International Organization for Standardization (ISO)
7. Factory Mutual Research Corporation

1.03 SUBMITTALS

A. Shop Drawings: Submit for approval the following:
   1. Manufacturer's literature, illustrations, specifications, detailed drawings, data and descriptive literature on all fire hydrant materials.
   2. Engineering data including dimensions, materials, size and weight.

B. Operation and Maintenance Data: Submit complete manuals including:
   1. Copies of all Shop Drawings, test reports, maintenance data and schedules, description of operation, and spare parts information.

C. Certificates:
   1. Where specified or otherwise required by ENGINEER, submit test certificates.
   2. The CONTRACTOR shall submit certificates of compliance with the applicable referenced standards.
   3. Submit certificate of compliance with NSF/ANSI Standard 61 for all products under this Section, including interior coatings, by an independent, authorized laboratory.

D. Delivery Tickets:
   1. Furnish delivery tickets indicating the manufacturer, identifying that the fire hydrant was new and from a manufacturer that has been submitted and approved.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. During delivery and handling, all materials shall be braced and protected from any distortion or damage; any such distortion or damage shall be basis for rejection of the materials.

B. Equipment used for unloading shall be covered with wood or rubber to avoid damage to the exterior of the materials. Do not drop or roll materials off trucks. All hydrants and valves shall be handled with padded slings or other appropriate equipment. The use of cables, hooks or chains will not be permitted.

C. The materials shall be inspected before and after unloading. Materials that are found to be cracked, gouged, chipped, dented or otherwise damaged will not be accepted.

D. Interiors of hydrants and valves shall be kept free from dirt and foreign matter.

E. Store all hydrants, valves and appurtenances on heavy wood blocking or platforms so they are not in contact with the ground.

F. Hydrants shall be unloaded opposite to or as close to the place where they are to be laid as is practical to avoid unnecessary handling.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General

1. All products, including interior coatings, shall be suitable for use in a potable water system.
2. Interior coating shall be certified to meet NSF/ANSI Standard 61.
3. All materials shall be suitable for use in potable water systems.
4. All hydrants shall have manufacturer's name cast in raised letters on hydrant body.
5. All bolts required to connect buried valves shall be Type 304 stainless steel or fluorocarbon coated, high strength corrosion resistant low alloy steel.
6. All other bolts, nuts and studs shall, unless otherwise specified, conform to ASTM A307, Grade B; or ASTM A354.
7. Bolts and nuts shall have hexagon heads and nuts.
8. Gasket material and installation shall conform to manufacturer's recommendations.
9. Hydrant shut-off gate valve (auxiliary valve) shall be resilient seat as specified in Section 331418, Valves and Appurtenances.
10. All hydrants, valves, and appurtenances must be new materials in first-class condition. Used or recycled materials will not be allowed, regardless of condition.

B. Hydrants

1. Hydrant shall be cast iron body, break-away type barrel, "O" ring operating stem seal and a 300 psi test pressure with a minimum 150 psi working pressure, in accordance with AWWA Standard C-502, latest revision.
2. All operating parts, including brass valve seat, shall be removable through the barrel without excavation.
3. Hydrant shall be compression type, with valve opening not less than 5-$^1/_4$ inches, with readily removable brass seats and non-rising stems. Valve shall open against pressure and shall close with pressure. Valve opening limit stops shall be in the shoe of the hydrant.
4. Hydrant shall have two 2-$^1/_2$-inch hose nozzles and one 4-$^1/_2$-inch steamer connection with National Standard threads and operating nuts.
5. Hydrants shall be designed to allow 5 feet of cover on the branch and allow 15-inches to 18-inches between the centerline of the lowest nozzle and the surface of the ground.
6. Operating nuts and caps shall be 1-$^3/_8$ inch square and shall turn right (clockwise) to close. Nozzle caps shall be chained to the barrel.
7. Hydrant piping shall be 6-inch restrained ductile iron pipe mechanical joint or anchor pipe unless otherwise specified.

8. Weep holes shall be provided for drainage and remain unplugged. If required by the OWNER, weep holes are to be plugged and the hydrant pumped dry after all flushing, testing, and other filling operations.

C. Acceptable Manufacturers
1. Kennedy - Guardian,
2. Mueller - Centurion,
3. Clow-Medallion,
4. American AVK Model 2780.

2.02 PAINT

A. All interior wetted surfaces of fire hydrants except finished or bearing surfaces shall be shop painted in accordance with NSF/ANSI Standard 61 specifications for potable water and applied in accordance with the manufacturer's recommendations. Exterior surfaces shall be factory painted with touch-up paint applied in field, as necessary, meeting the following criteria:
1. OSHA safety yellow.
2. Conforming to Federal lead standards.
3. Polyeurethane modified alkyd.
4. Solids by weight 67.5%.
5. Solids by volume 46%.
6. Paint shall not be supplied in spray-can container.
7. Manufacturers: Dutch Standard DEF1-Rust Enamel #448, Rust-Oleum #944, Pennsbury Hydrant-Hide #9032, Con-Lux Steel Guard #8504 Caution Yellow and Bruning Silathane #52035 Yellow, or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General
1. Install all hydrants and components in accordance with manufacturer's instructions.
2. The hydrant shall be set plumb with the center of the lowest nozzle between 15 inches and 18 inches above the finished grade or as specified by the ENGINEER. The pumper nozzle shall be oriented normal to the near edge of pavement.
3. The auxiliary valve shall be located as close to the main line as possible and at no time shall the center of the hydrant to the center of the auxiliary valve be less than 36 inches. The valve shall not be placed in pavement.
4. No part of the hydrant shall be closer than 2 feet to the face of the curb or 5 feet to the edge of the pavement where no curb exists or as per governing municipalities requirements.

5. All pipe connecting the main to the hydrant stem shall be 6 inch ductile iron pipe, fully restrained by use of anchor pipe or mechanical restraints as specified. Use of tie-rods shall be restricted to restraining existing conditions.
6. A drain pocket of clean No. 1 stone shall be provided as shown on the Drawings.
   a. The granular material shall be extended above the hydrant drain.
7. Grease all hydrant nozzle threads after installation. The upper stem shall be lubricated with oil or grease. If grease is used, provide alemite fittings. Lubricate areas to be sealed from wet areas with "O" rings. Grease used shall be a food grade compound specially formulated for fire hydrants.
8. Install concrete block during hydrant installation for thrust restraint.

B. Inspection
1. All hydrants and valves will be inspected by the ENGINEER prior to installation. Damaged or defective materials will be rejected whether previously incorporated into the work or not.
2. Prior to the work in this section, the CONTRACTOR shall inspect the installation area to determine if the work of other trades has progressed to the point where the installation may properly commence.
3. The CONTRACTOR shall verify that the installation can proceed in accordance with all pertinent codes and regulations, the original design and the referenced standards.

C. Discrepancies
1. If the above referenced inspection reveals discrepancies, the CONTRACTOR shall notify the ENGINEER immediately.
2. The CONTRACTOR shall not proceed with the installation in areas of discrepancy until said discrepancy is resolved.

3.02 PAINTING

A. All interior wetted surfaces of fire hydrants except finished or bearing surfaces shall be shop painted in accordance with NSF/ANSI Standard 61 for potable water and applied in accordance with the manufacturers recommendations. Exterior surfaces shall be factory painted yellow and shall be repainted yellow in the field after installation with paint meeting the requirements of this specification.

3.03 TESTING

A. All parts and components shall be adjusted as required to provide correct operation.

B. The CONTRACTOR shall demonstrate to the ENGINEER'S satisfaction that all system components operate correctly, both individually and as a system. All testing equipment required shall be provided by the CONTRACTOR.

C. CONTRACTOR will replace fire hydrant assemblies, which are leaking or are considered suspect by the ENGINEER.

END OF SECTION

SECTION 337119

ELECTRICAL UNDERGROUND DUCTS AND MANHOLES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Rigid steel conduit.
   2. Underground duct markers.

B. Related Requirements:
   1. Section 310513.95 – Restoration.
   2. Section 312333 – Excavation, Backfill and Trenching.

1.02 REFERENCE STANDARDS

A. American National Standard Institute:
   1. ANSI C80.1 – American National Standard for Electric Rigid Steel Conduit, Zinc Coated.

B. ASTM International:
   1. ASTM C1037 - Standard Practice for Inspection of Underground Precast Concrete Utility Structures.

C. National Electrical Manufacturers Association:
   1. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing (EMT) and Cable.

D. UL:
   1. UL 651A - Type EB and A Rigid PVC Conduit and HDPE Conduit.

1.03 COORDINATION

A. Section 013113 – Project Coordination: Requirements for coordination.

1.04 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Requirements for submittals.

B. Product Data: Submit manufacturer information for metallic conduit.

C. Shop Drawings: Indicate dimensions, reinforcement, size and locations of openings, and accessory locations for precast manholes.

1.05 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents:
   1. Record actual routing and elevations of underground conduit, and duct.
   2. Record actual locations and sizes of manholes.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with local codes, standards, and utility requirements.

1.07 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years experience.

1.08 COORDINATION

A. Section 013113 – Project Coordination: Requirements for coordination.

B. Coordinate Work with existing underground utilities and structures.

1.09 DELIVERY, STORAGE AND HANDLING

A. Section 016500 – Transportation and Handling of Materials and Equipment: Requirements for transporting and handling products.

B. Section 016600 – Storage of Material: Requirements for storing and protecting products.

C. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

D. Store products according to manufacturer instructions.

PART 2 - PRODUCTS

2.01 SYSTEM DESCRIPTION

A. Interconnected system of conduits and manholes to distribute medium-voltage power and low-voltage power.

B. Routing:
   1. Conduit and duct routing and manhole locations are shown in approximate locations unless dimensions are indicated.
   2. Route and locate to complete duct bank system.

C. Medium-voltage: Use rigid steel conduit.

D. Low-voltage: Use rigid plastic conduit.

E. Data communication: Use rigid plastic conduit.

2.02 RIGID STEEL CONDUIT (NEC TYPE RMC)

A. Manufacturers:
   1. Allied Tube & Conduit
   2. EGS/Appleton Electric
   3. Republic Conduit
   4. Western Tube and Conduit
   5. Substitutions: Section 012513 – Substitution Procedures.

B. Description:
   1. Rigid Steel Conduit: Comply with ANSI C80.1.
   2. Fittings:
      a. Comply with NEMA FB 1.
      b. Material: Steel.

C. Rigid steel conduit and fittings shall be hot-dip galvanized inside and out.

2.03 PLASTIC CONDUIT

A. Manufacturers:
   1. Cantex
   2. Carlon
   3. Substitutions: Section 012513 – Substitution Procedures.

B. Description:
   1. Rigid Plastic Conduit:
      a. Comply with NEMA TC 2.
      b. Material: Schedule 80 PVC
      c. Fittings and Conduit Bodies: Comply with NEMA TC 3.

2.04 ACCESSORIES

A. Underground Duct Markers:
   1. Underground Warning Tape: 4-inch wide plastic tape, detectable type, colored red and with suitable warning legend describing buried electrical lines.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Section 017000 – Execution and Closeout Requirements: Requirements for installation examination.

B. Verify routing and termination locations of duct bank prior to excavation for rough-in.

C. Verify locations of manholes prior to excavating for installation.

3.02 PREPARATION

A. Section 017000 – Execution and Closeout Requirements: Requirements for installation preparation.

B. Existing Work:
   1. Abandoned duct bank to remain in place.
   2. Maintain access to existing duct bank and other installations remaining active and requiring access.
   3. Extend existing duct bank installations using materials and methods compatible with existing electrical installations.
   4. Clean and repair existing duct bank to remain or to be reinstalled.

3.03 INSTALLATION

A. Duct Bank:
   1. Install duct to locate top of ducts at depths as indicated on Drawings.
   2. Install power communications conduit and duct such that top of duct bank is located minimum 36 inches below finished grade or as indicated on plans or approved by the Engineer.
   3. Conduit and duct with minimum slope:
      a. Minimum 4 inches per 100 feet (0.33 percent).
      b. Slope conduit and duct towards manholes and away from building entrances.
   4. Cut conduit and duct square using saw or pipe cutter, and de-burr cut ends.
   5. Insert conduit and duct to shoulder of fittings, and fasten securely.
   6. Connecting:
      a. Join nonmetallic conduit and duct using adhesive as recommended by manufacturer.
      b. Wipe nonmetallic conduit and duct dry and clean before joining.
      c. Apply full even coat of adhesive to entire area inserted in fitting.
      d. Allow joint to cure for minimum 20 minutes.
   7. Install no more than equivalent of three 90-degree bends between pull points.
   8. Install fittings to accommodate expansion and deflection.
   9. Terminate conduit and duct at manhole entries using end bell.
   10. Separators and Chairs:
      a. Provide suitable separators and chairs, installed not greater than 4 feet o.c.
      b. Secure separators and chairs to trench bottom prior to backfilling.
   11. Band conduits and ducts together before backfilling.
   12. Securely anchor conduit and duct to prevent movement during backfilling.
   13. Provide suitable pull string in each empty duct except sleeves and nipples.

14. Swab duct, and provide suitable caps to protect installed duct against entrance of dirt and moisture.
15. Backfill trenches as specified in Section 312333 – Excavation, Backfill and Trenching.
16. Duct Markers:
    a. Interface installation of underground duct markers with backfilling as specified in Section 312333 – Excavation, Backfill and Trenching.
    b. Install 6 inches below finished surface.

END OF SECTION

SECTION 337173

ELECTRICAL UTILITY SERVICES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Arrangements with Utility Company for permanent electric service.
   2. Payment of Utility Company for service charges.
   3. Utility metering equipment.

B. Related Requirements:
   1. Section 033000 - Cast-in-Place Concrete: Concrete pads.

1.02 DEFINITIONS

A. Utility Company: National Grid (NGRID).

1.03 COORDINATION

A. Section 013000 - Administrative Requirements: Requirements for coordination.

B. Coordinate/verify all service related issues with the local utility prior to any installation.

C. Al installation shall be in accordance with the N.E.C., local utility, State, Town and local jurisdiction requirements.

D. Coordinate Work of this Section with Utility Company, including relocation of overhead or underground lines interfering with construction.

E. If power lines are to be relocated, bill utility costs directly to Owner.

F. Service Installation:
   1. Contact Utility Company regarding charges related to service installation, and include charges in Contract.

1.04 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Shop Drawing procedures.

B. Submit drawings prepared by Utility Company.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.

1.05 QUALITY ASSURANCE

A. Perform Work according to Utility Company written requirements, and maintain one copy at Site.

1.06 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on Drawings.

PART 2 - PRODUCTS

2.01 SYSTEM DESCRIPTION

A. System Characteristics: new 5KV, three phase, three wire underground utility company primary service, new utility company 3 phase transformer, new 480Y/277 V, three phase, 4 wire, 60Hz service to ECWA tank service equipment and a new 480V, single phase, three wire, 60 Hz service to 911 service equipment.

B. Service Entrance: Underground.

C. Overhead Service Provisions: new service riser at replaced utility company pole.

D. Underground Service Provisions:
   1. Underground service entrance to tank service entrance equipment.
   2. Underground service entrance to 911 service entrance equipment.
   3. Utility Primary Service-Entrance Conductor Connection: At Utility Company terminal pole and Utility Company pad-mounted transformer.

E. The electrical contractor is responsible for the complete ready to use electrical service installations.

2.02 UTILITY METERS

A. Furnished by Utility Company.

B. Description: EC 911 - Self-contained watt-hour meter, rated 200A at 120/240V, single phase.

C. Description: ECWA – C/T cabinet and watt-hour meter, rated 400A at 480/277V, three phase.

2.03 UTILITY METER BASE

A. Furnished by Utility Company.

2.04 METERING TRANSFORMER CABINET

A. As per National Grid requirements.

2.05 TRANSFORMER PAD

A. Material: Cast-in-place concrete as specified in Section 033000 - Cast-in-Place Concrete.

B. Size: As indicated on Drawings and per National Grid requirements.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.

B. Verify that service equipment is ready to be connected and energized.

3.02 PREPARATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.

B. Remove exposed abandoned service pole riser, entrance raceway and conductors, transformer pad, Cut raceway flush with walls and floors, and patch surfaces.

C. Disconnect and remove abandoned service equipment.

D. Clean and repair existing service equipment to remain or to be reinstalled.

3.03 INSTALLATION

A. Utility Pole Service Riser:
   1. Install according to Utility Company requirements.

B. Service Entrance Conduits:
   1. Install service entrance feeders and conduits to EC 911 and ECWA tank service entrance equipment.
   2. Utility Company will connect service lateral conductors to service entrance conductors.

C. Install cast-in-place concrete pad for Utility Company transformer, as specified in Section 033000 - Cast-in-Place Concrete.

END OF SECTION

SECTION 337900

SITE GROUNDING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Rod electrodes.
   2. Exothermic connections.
   3. Mechanical connectors.
   4. Wire.

B. Related Requirements:
   1. Section 260526 – Grounding and Bonding for Electrical Systems.

1.02 REFERENCE STANDARDS

A. The Institute of Electrical and Electronics Engineers, Inc.:
   1. IEEE 80 - Approved Draft Guide for Safety in AC Substation Grounding.
   2. IEEE 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems.

B. InterNational Electrical Testing Association:
   1. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems.

1.03 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Requirements for submittals.

B. Product Data: Submit data for grounding electrodes and connectors.

C. Shop Drawings: Indicate layout and installation details of grounding components.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Test and Evaluation Reports: Indicate overall resistance-to-ground.

F. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.

G. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

H. Qualifications Statement:
   1. Submit qualifications for manufacturer.

1.04 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record actual locations of electrodes and connections.

1.05 QUALITY ASSURANCE

A. Comply with IEEE 142.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three (3) years' experience.

PART 2 - PRODUCTS

2.01 DESCRIPTION

A. Multiple vertical electrodes buried in configuration as indicated on Drawings.

2.02 PERFORMANCE AND DESIGN CRITERIA

A. Overall Resistance-to-Ground: 5 ohms.

2.03 ROD ELECTRODES

A. Manufacturers:
   1. ERICO International Corporation
   2. Harger Lightning & Grounding
   3. Substitutions: Section 012513 – Substitution Procedures.

B. Description: Copper-clad steel ground rods.

C. Diameter: 3/4 inch.

D. Length: 10 feet.

2.04 EXOTHERMIC CONNECTIONS

A. Manufacturers:
   1. Burndy
   2. ERICO International Corporation
   3. Harger Lightning & Grounding
   4. Substitutions: Section 012513 – Substitution Procedures.

B. Description: Exothermic materials, accessories, and tools for preparing and making permanent field connections between grounding system components.

2.05 MECHANICAL CONNECTORS

A. Manufacturers:
   1. Burndy
   2. ERICO International Corporation
   3. Galvan Industries, Inc.
   4. Harger Lightning & Grounding
   5. Substitutions: Section 012513 – Substitution Procedures.

B. and in configurations required for particular installation.

2.06 WIRE

A. Material: Stranded copper.

B. Minimum Size of Horizontal Electrodes: 4/0 AWG.

C. Minimum Size of Connections to Electrodes: 4/0 AWG.

D. Minimum Size of Bonding to Other Objects: 2/0 AWG.

E. Mechanical Connectors: Bronze.

F. Grounding Boxes: Bronze.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.

B. Verify that final backfill and final compaction have been completed before driving rod electrodes.

C. Verify that trenching has been completed before installing horizontal electrodes.

3.02 PREPARATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.

B. Remove exposed and abandoned grounding components by cutting conductors flush with grade and pavement, and then patching surfaces.

C. Existing Installations:
   1. Provide access to existing grounding electrodes, connections, and other installations remaining active and requiring access.

D. Extend existing Site grounding installations using materials and methods compatible with existing installations, or as specified.

E. Clean and repair existing remaining grounding connections.

3.03 INSTALLATION

A. Install rod electrodes [in vertical position with bottom at least 5 feet below frost line.

B. Install interconnecting wire 3 feet below finished grade level.

3.04 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.

B. Section 017000 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.

C. Inspect and test according to NETA ATS, except Section 4.

D. Perform inspections and tests as listed in NETA ATS, Section 7.13.

3.05 DEMONSTRATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for demonstration and training.

B. Demonstrate location of each accessible grounding connection.

END OF SECTION

SECTION 400506

PIPING SPECIALTIES AND ACCESSORIES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified
   1. CONTRACTOR shall provide all labor, materials, equipment, tools, services, and incidentals necessary to furnish and install piping specialties and accessories as shown, specified and required. Included, but not limited to the following: couplings, repair clamps, joint clamps, service saddles, service fittings, water meter fittings, tile set, corporation stops, curb stops, and curb boxes.

B. Related Work Specified Elsewhere
   1. Section 312323 - Select Granular Materials
   2. Section 312333 - Excavation, Backfill and Trenching
   3. Section 330110.58 - Testing and Disinfection
   4. Section 330517 - Copper Pipe
   5. Section 330519 - Ductile Iron Pipe, Fittings and Accessories
   6. Section 331418 - Valves and Appurtenances

1.02 QUALITY ASSURANCE

A. Manufacturer's Qualifications
   1. Manufacturer shall have a minimum of 5 years of experience in the production of substantially similar types of piping specialties specified and shall show evidence of satisfactory service in at least 5 installations.
   2. Parts Interchangeability: It is the intent of these specifications that all materials furnished herein shall be compatible with similar materials of other manufacturers.

B. Reference Standards
   1. AWWA C104, Cement-Mortar Lining for Ductile Iron Pipe and Fittings for Water
   2. AWWA C115, American National Standard for Flanged Ductile-Iron Pipe with Ductile-Iron Pressure Pipe and Fittings
   3. AWWA C301, Prestressed Concrete Pressure Pipe, Steel-Cylinder Type, for Water and Other Liquids
   4. AWWA C600, Standard for Installation of Ductile-Iron Watermains and Their Appurtenances

5. AWWA C605, Standard for Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water
6. AWWA C651, Standard for Disinfecting Watermains
7. AWWA C800, Underground Service Line Valves and Fittings
8. AWWA C900, Polyvinyl Chloride (PVC) Pressure Pipe, 4-inch Through 12-inch for Water Distribution
9. ASTM A536, Standard Specification for Ductile Iron Castings
10. ASTM B92, Specification for Standard Size Seamless Copper Pipe
11. ASTM B62, Standard Specification for Composition Bronze or Ounce Metal Castings
12. ASTM D2000, Standard Classification System for Rubber Products in Automotive Applications
13. NSF/ANSI Standard 61
14. Underwriter's Laboratories (UL)
15. International Organization for Standardization (ISO)
16. Factory Mutual Research Corporation
17. 1996 Safe Drinking Water Act

1.03 SUBMITTALS

A. Shop Drawings: Submit for approval the following:
1. Manufacturer's literature, illustrations, specifications, detailed drawings, data and descriptive literature on all piping specialties.
2. Deviations from Drawings and Specifications.
3. Engineering data including dimensions, materials, size and weight.
4. Fabrication, assembly, installation and wiring diagrams.

B. Operation and Maintenance Data: Submit complete manuals including:
1. Copies of all Shop Drawings, test reports, maintenance data and schedules, description of operation, and spare parts information.

C. Certificates:
1. Where specified or otherwise required by ENGINEER, submit test certificates.
2. The CONTRACTOR shall submit certificates of compliance with the applicable referenced standards.
3. Submit certificate of compliance with NSF/ANSI Standard 61 for all products under this section, including interior coatings, by an independent, authorized laboratory.

D. Delivery Tickets:
1. Furnish delivery tickets indicating the manufacturer, accessory type and class, identifying that the equipment was new and from a manufacturer that has been submitted and approved.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. During delivery and handling, all materials shall be braced and protected from any distortion or damage; any such distortion or damage shall be basis for rejection of the materials.

B. Handle all materials very carefully. Materials which are cracked, dented or otherwise damaged will not be accepted.

C. The materials shall be inspected before and after unloading. Materials that are found to be cracked, gouged, chipped, dented or otherwise damaged will not be accepted.

D. Interiors of pipe, fittings and accessories shall be kept free from dirt and foreign matter.

E. Store piping specialties and accessories on heavy wood blocking or platforms as necessary so they are not in contact with the ground.

F. Pipe, fittings, and specials shall be unloaded as necessary opposite to or as close to the place where they are to be used as is practical to avoid unnecessary handling.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General
   1. All products, including interior coatings shall be suitable for use in a potable water system.
   2. All products, including wetted parts, shall be certified to meet NSF/ANSI Standard 61.
   3. All piping specialties and accessories must be new materials in first-class condition. Used or recycled materials will not be allowed, regardless of condition.

B. Couplings
   1. Hymax Coupling:
      a. Material: Center sleeve shall be fabricated of high strength carbon steel tubing. Compression end rings to be either one bolt or two fabricated of carbon steel.
      b. Gasket: Two layered gaskets of which the inner ring is removable to expand the range of the coupling. Material shall be EPDM according to NSF61.

c. Bolts and Nuts: Buried or submerged couplings shall be provided with type 304 stainless steel. Bolts to be coated with an anti-seize coating to prevent galling.
d. Coating: Interior and exterior shall be provided with NFS-61 approved fusion bonded epoxy coating.
e. Harnessing: as specified herein.
f. To be used only when approved by ENGINEER.
g. Manufacturer:
1) Dresser Industries Style 262 for sizes up to 12-inches,
2) Or approved equal.

C. Restrained Flanged Adapter
1. Restraint shall be accomplished by use of a gland that incorporates wedges that increase their resistance to pull out as pressure or external forces increase.
2. The restrained flange adapter shall be comprised of two rings made of ductile iron conforming to ASTM A536.
3. The restraining ring shall be suitable for flanges conforming to AWWA C115 flange drilling.
4. Nuts and bolts shall be fluorocarbon coated or Type 304 stainless steel, high strength, low alloy.
5. Torque limiting twist off nuts shall be used to insure the proper actuation of the wedges. When the nut is sheared off, a standard hex head shall remain.
6. Provide fusion bonded epoxy coating on the gasket ring and shop primer on the body.
7. Restrained flange adapter shall be suitable for use on ductile iron pipe.
8. Manufacturer:
a. EBAA Iron, Series 2100 Megaflange,
b. Or approved equal.

D. Service Saddles
1. Service saddles for iron, asbestos-cement pipe or Polyvinyl Chloride (PVC) pipe shall be of the double strap style.
2. Bodies shall be brass alloy conforming to ASTM B62 (85-5-5-5) and a threaded outlet conforming to AWWA C800.
3. Straps shall be high quality silicon bronze, flattened to provide a wider bearing surface to the pipe.
4. Nuts shall be brass alloy as per ASTM B62.
5. Gasket shall be Buna-N rubber in accordance with ASTM D2000.
6. Manufacturer:
a. Smith-Blair, Style 323,
b. Ford, Style 202B,
c. Or approved equal.

E. Services Fittings: Bronze Unions, Couplings and Adapters

1. General
   a. Service fittings shall have a body cast from corrosion resistant bronze in accordance with ASTM B62 (85-5-5-5).
   b. Connections shall meet applicable sections of AWWA C-800 and be suitable for flared connection to type K copper pipe.
2. Manufacturer:
   a. Unions, copper to copper, three parts:
      1) Mueller Co #H-15400,
      2) Ford C22-XX,
      3) Or approved equal.
   b. Unions, copper to copper, two parts:
      1) Mueller Co #H-15405,
      2) Ford C02-XX,
      3) Or approved equal.
   c. Eighth bend coupling with gasket:
      1) Mueller Co #H-15063,
      2) Ford LA02-XX,
      3) Or approved equal.
   d. Quarter bend coupling with gasket:
      1) Mueller Co #H-15068,
      2) Ford L02-XX,
      3) Or approved equal.
   e. Straight male adapter:
      1) Mueller Co #H-15425,
      2) Ford C28-XX,
      3) Or approved equal.
   f. Straight female adapter:
      1) Mueller Co #H-15450,
      2) Ford C21-XX,
      3) Or approved equal.

F. Curb Stops

1. Curb stops shall be manufactured in accordance with AWWA C-800 and shall have all brass components conforming to 85-5-5-5 ASTM B62.
2. Curb stops shall be ball type, quarter turn to open or close, and shall be suitable for potable water service buried application.
3. Components shall be suitable for operating pressure meeting or exceeding AWWA C-800 criteria for high pressure application.
4. Manufacturer:
   a. Mueller:
      1) $^{3}/_{4}$-inch through 2-inch copper to copper: B25204.
      2) $^{3}/_{4}$-inch through 2-inch copper to iron: B25174.

b. Ford:
   1) $^{3}/_{4}$-inch through 2-inch copper to copper: B22.
   2) $^{3}/_{4}$-inch through 2-inch copper to iron: B21,
c. Or approved equal.

2.02 PAINTING

A. Shop Painting
   1. Clean and prime coat ferrous metal surfaces.
   2. All interior wetted ferrous surfaces of valves and appurtenances except finished or bearing surfaces shall be shop-painted with an approved epoxy paint system certified to NSF/ANSI Standard 61 for potable water and applied in accordance with the paint system manufacturer's recommendations.
   3. Coat machined, polished and non-ferrous surfaces including gears, bearing surfaces and similar unpainted surfaces with corrosion prevention compound listed in NSF/ANSI Standard 61 and applied in accordance with the manufacturer's recommendations. Maintain coating during storage and until equipment begins operation.

PART 3 - EXECUTION

3.01 GENERAL

A. Install piping specialties and accessories in accordance with applicable sections; as shown on the Drawings; and as specified, required or directed.

END OF SECTION

SECTION 400507

HANGERS AND SUPPORTS FOR PROCESS PIPING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Pipe hangers and supports.
   2. Hanger rods.
   3. Structural attachments.
   4. Pipe guides.
   5. Formed-steel channel.

1.02 SUBMITTALS

A. Product Data: Manufacturer information, including load capacity.

B. Shop Drawings: System layout with location, including critical dimensions, sizes, hanger and support locations, and details of trapeze hangers, anchors, and guides.

C. Welder Certificates: Certify welders and welding procedures employed on Work, verifying AWS qualification within previous 12 months.

1.03 QUALITY ASSURANCE

A. Installer: Company specializing in performing Work of this Section with three (3) years' experience.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Store materials according to manufacturer instructions.

B. Protection:
   1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
   2. Provide additional protection according to manufacturer instructions.

1.05 EXISTING CONDITIONS

A. Field Measurements:
   1. Verify field measurements prior to fabrication.
   2. Indicate field measurements on Shop Drawings.

1.06 WARRANTY

A. Furnish five (5)-year manufacturer's warranty for pipe hangers and supports.

PART 2 - PRODUCTS

2.01 PIPE HANGERS AND SUPPORTS

A. Manufacturers:
   1. Carpenter & Paterson, Inc.
   2. Empire Industries, Inc.
   3. Or equal.

B. Description:
   1. Comply with MSS SP-58.
   2. Provide means of vertical adjustment after erection.
   3. Floor Supports: 316 Stainless Steel adjustable pipe saddle, lock nut, nipple, floor flange, and steel support.

C. Performance and Design Criteria:
   1. Riser Supports: Support risers on each floor with riser clamps and lugs, independent of connected horizontal piping.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that field dimensions as indicated.

3.02 INSTALLATION

A. Do not cut structural members.

B. Pipe Supports:
   1. Comply with MSS SP-58.
   2. Support horizontal piping as indicated on the Drawings.

C. Equipment Bases and Supports:
   1. Housekeeping Pads:
      a. Material: Concrete, as specified in Section 033300 - Cast-in-Place Concrete.
   2. Housekeeping Pads: As indicated on the Drawings.
   3. Supports:
      a. Anchor Bolts and Accessories: Use templates furnished with equipment.

D. Finishes:
   1. Prime coat exposed supports as specified in Section 099000 - Painting and Coating.

END OF SECTION

SECTION 400551 - COMMON REQUIREMENTS FOR PROCESS VALVES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Valves.

B. Related Requirements:
   1. Section 033000 - Cast-in-Place Concrete: Execution requirements for placement of concrete as required by this Section.
   2. Section 055000 - Metal Fabrications: Miscellaneous metalwork and fasteners specified by this Section.
   3. Section 099000 - Painting and Coating: Product and execution requirements for painting specified by this Section.
   4. Section 330110.58 – Testing and Disinfection.
   5. Section 331418 – Valves and Appurtenances: Ball Valves.
   6. Section 400513 - Common Work Results for Process Piping: Connection of valves to process piping as specified in this Section.
   7. Section 400529 - Hangers and Supports for Process Piping and Equipment: Product and execution requirements for valve supports specified by this Section.

1.02 REFERENCE STANDARDS

A. American Water Works Association:
   1. AWWA C541 - Hydraulic and Pneumatic Cylinder and Vane-Type Actuators for Valves and Slide Gates.
   2. AWWA C542 - Electric Motor Actuators for Valves and Slide Gates.
   3. AWWA C550 - Protective Interior Coatings for Valves and Hydrants.

B. ASTM International:
   1. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings.
   2. ASTM B584 - Standard Specification for Copper Alloy Sand Castings for General Applications.

C. Manufacturers Standardization Society of the Valve and Fittings Industry:
   1. MSS SP-25 - Standard Marking System for Valves, Fittings, Flanges and Unions.

D. National Electrical Manufacturers Association:
   1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

E. National Fire Protection Association:
   1. NFPA 70 - National Electrical Code (NEC).

F. NSF International:
   1. NSF 61 - Drinking Water System Components - Health Effects.
   2. NSF 372 - Drinking Water System Components - Lead Content.

G. UL:
   1. Equipment Directory.

1.03 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Requirements for submittals.

B. Product Data:
   1. Submit manufacturer data for actuator with model number and size indicated.
   2. Submit valve cavitation limits.

C. Shop Drawings:
   1. Provide assembly drawings indicating parts list, materials, sizes, position indicators, limit switches, control system, actuator mounting, wiring diagrams, and control system schematics.

D. Valve-Labeling Schedule: Indicate valve locations and nametag text.

E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

F. Certification of Valves Larger than 12 inches: Furnish certified copies of hydrostatic factory tests, indicating compliance with applicable standards.

G. Manufacturer Instructions: Submit installation instructions and special requirements.

H. Source Quality-Control Submittals: Indicate results of factory tests and inspections.

1.04 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record actual locations of valves and actuators.

1.05 MAINTENANCE MATERIAL SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance materials.

B. Spare Parts:
   1. Furnish one set of manufacturer's recommended spare parts.

1.06 QUALITY ASSURANCE

A. Maintain clearances as indicated on Drawings.

B. Ensure that materials of construction of wetted parts are compatible with process liquid.

1.07 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five years' documented experience.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Section 016500 – Transportation and Handling of Materials and Equipment and 016600 – Storage of Material.

B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Store materials according to manufacturer instructions.

D. Protection:
   1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
   2. Protect valve ends from entry of foreign materials by providing temporary covers and plugs.
   3. Provide additional protection according to manufacturer instructions.

1.09 EXISTING CONDITIONS

A. Field Measurements:
   1. Verify field measurements prior to fabrication.
   2. Indicate field measurements on Shop Drawings.

1.10 WARRANTY

A. Section 017000 - Execution and Closeout Requirements: Requirements for warranties.

PART 2 - PRODUCTS

2.01 VALVES

A. Description: Valves, operator, actuator, handwheel, chainwheel, extension stem, floor stand, worm and gear operator, torque tube operators, operating nut, chain, wrench, and other accessories as required.

B. Valve Ends: Compatible with adjacent piping system.

C. Operation:
   1. Open by turning counterclockwise; close by turning clockwise.
   2. Cast directional arrow on valve or actuator with OPEN and CLOSE cast on valve in appropriate location.

D. Valve Marking and Labeling:
   1. Marking: Comply with MSS SP-25.
   2. Labeling: As specified in pipe schedule.

E. Valve Construction:
   1. Bodies: Rated for maximum temperature and pressure to which valve will be subjected as specified in valve Sections.
   2. Bonnets:
      a. Flanged to body and of same material and pressure rating as body.
      b. Furnish glands, packing nuts, or yokes as specified in valve Sections.
   3. Stems and Stem Guides:
      a. Materials and Seals: As specified in valve Sections.
      b. Bronze Valve Stems: According to ASTM B62.
      c. Space stem guides 10 feet o.c.
      d. Submerged Stem Guides: Type 304 stainless steel.
   4. All bolts, nuts and studs shall, unless otherwise approved, shall conform to ASTM A307, Grade B; or ASTM A354. All bolts, nuts and studs on or required to connect submerged or buried valves shall be fluorocarbon coated.
   5. Bolts and nuts shall be hexagon heads and nuts.

2.02 VALVE ACTUATORS

A. Provide actuators with position indicators for shutoff valves 6 inches and larger.

B. Comply with AWWA C541 and C542.

C. Provide chain actuators and means to operate hand/auto lever for shutoff valves mounted 5½ feet above operating floor level.

D. Provide gear actuators with position indicators.

E. Gear-Assisted Manual Actuators:
   1. Provide totally enclosed gears.
   2. Maximum Operating Force: 60 lbf.
   3. Bearings: Permanently lubricated bronze.
   4. Packing: Accessible for adjustment without requiring removal of actuator from valve.

F. Chain Actuator:
   1. Description: Chain guides and hot-dip-galvanized operating chain extending to 5-1/2 feet above operating floor level.
   2. Chain Wheels: Sprocket-rim type.
   3. Furnish chain storage if chains may interfere with pedestrian traffic.

G. Accessories:
   1. Handwheel:
      a. Furnish permanently attached handwheel for emergency manual operation.
      b. Rotation: None during powered operation.
      c. Permanently affix directional arrow and cast OPEN on handwheel to indicate appropriate direction to turn handwheel.
      d. Maximum Operating Force: 60 lbf.

2.03 FINISHES

A. Valve Lining and Coating: Comply with AWWA C550.

B. Exposed Valves: As specified in Section 099000 - Painting and Coating.

C. Do not coat flange faces of valves unless otherwise specified.

2.04 SOURCE QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for testing, inspection, and analysis.

B. Shop Tests: Submit for approval the following:
   1. Hydrostatic tests for each valve when required by the valve specifications included herein.
   2. The manufacturer of butterfly valves shall submit certified copies of reports covering the bi-directional leakage tests in accordance with Section 6, AWWA C504.
   3. The manufacturer of ball valves shall submit certified copies of reports covering the tests in accordance with Section 5, AWWA C507.

C. Certificates:
   1. Where specified or otherwise required by Engineer, submit test certificates.

2. The Contractor shall submit certificates of compliance with the applicable referenced standards.
3. Submit certificate of compliance with NSF/ANSI Standard 61 for all products under this section, including interior coatings, by an independent, authorized laboratory.

D. Delivery Tickets:
1. Furnish delivery tickets indicating the valve manufacturer, valve type and class, identifying that the valves are new and from a manufacturer that has been submitted and approved.

E. Testing Criteria:
1. Contractor must provide manufacturer's test specifications for all tapping sleeve and valves prior to field testing.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install valves, actuators, extensions, valve boxes, and accessories according to manufacturer instructions.

B. Firmly support valves to avoid undue stresses on piping.

C. Coat studs, bolts, and nuts with anti-seizing lubricant.

D. Clean field welds of slag and splatter to provide a smooth surface.

E. Install valves with stems upright or horizontal, not inverted.

F. Install valves with clearance for installation of insulation and allowing access.

G. Provide access where valves and fittings are not accessible.

H. Comply with Section 400507 - Hangers and Supports for Process Piping for pipe hangers and supports.

I. Install insulation as indicated on Drawings and pipe schedule.

J. Valve Applications:
1. Install valves at locations as indicated on Drawings and as specified in this Section.
2. Install shutoff and isolation valves.
3. Isolate equipment, part of systems, or vertical risers as indicated on Drawings.
4. Install valves for throttling, bypass, or manual flow control services as indicated on Drawings.

3.02 FIELD QUALITY CONTROL

A. Section 017000 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.

B. Valve Field Testing:
   1. Test for proper alignment.
   2. If specified by valve Section, field test equipment to demonstrate operation without undue noise, vibration, or overheating.
   3. Engineer will witness field testing.

END OF SECTION

SECTION 400553 - IDENTIFICATION FOR PROCESS PIPING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Nameplates.
   2. Tags.
   3. Stencils.
   4. Pipe markers.
   5. Ceiling tacks.
   6. Labels.

B. Related Requirements:
   1. Section 099000 - Painting and Coating: Execution requirements for painting specified by this Section.
   2. Section 400513 - Common Work Results for Process Piping: Basic materials and methods for process piping systems.
   3. Section 400523 - Common Work Results for Process Valves: Basic materials and methods or valves.

1.02 REFERENCE STANDARDS

A. American Society of Mechanical Engineers:
   1. ASME A13.1 - Scheme for the Identification of Piping Systems.

1.03 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit manufacturer's catalog literature for each product required.

C. Shop Drawings: Submit list of wording, symbols, letter size, and color-coding for mechanical identification and valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

1.04 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for closeout procedures.

1.05 QUALITY ASSURANCE

A. Conform to ASME A13.1 for color scheme for identification of piping systems and accessories.

B. Conform to 10 States Standards for color scheme for identification of potable water piping systems.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.

PART 2 - PRODUCTS

2.01 STENCILS

A. Manufacturer List:
   1. Kolbi Pipe Marker Co.
   2. Marking Services, Inc.
   3. Pipemarker.com; Brimar Industries, Inc.
   4. R & R Identification Co.
   5. Seton Identification Products
   6. Substitutions: Specified in Section 016000 - Product Requirements.

B. Description:
   1. Clean-cut symbols.
   2. Letters:
      a. Up to 2-inch Outside Diameter of Insulation or Pipe: 1/2-inch-high letters.
      b. 2-1/2- to 6-inch Outside Diameter of Insulation or Pipe: 1-inch-high letters.
      c. Over 6-inch Outside Diameter of Insulation or Pipe: 1-3/4-inch-high letters.

C. Stencil Paint: As specified in Section 099000 - Painting and Coating; semigloss enamel.

D. Color-Coding and Lettering Size: Conform to ASME A13.1.

2.02 PIPE MARKERS

A. Color-Coding and Lettering Size: Conform to ASME A13.1.

B. Plastic Pipe Markers:
   1. Manufacturer List:
   2. Brady ID.
   3. Craftmarker Pipe Markers.
   4. Marking Services, Inc.
   5. R & R Identification Co.
   6. Seton Identification Products.

7. Description:
    a. Factory-fabricated, flexible, semi-rigid plastic.
    b. Preformed to fit around pipe or pipe covering.
    c. Larger sizes may have maximum sheet size with spring fastener.

C. Plastic Tape Pipe Markers:
1. Manufacturer List:
2. Brady ID.
3. Craftmarker Pipe Markers.
4. Kolbi Pipe Marker Co.
5. Marking Services, Inc.
6. Pipemarker.com; Brimar Industries, Inc.
7. Seton Identification Products.
8. Substitutions: Specified in Section 016000 - Product Requirements.

D. Description: Flexible, vinyl film tape with pressure-sensitive adhesive backing and printed markings.

2.03 LABELS

A. Manufacturer List:
1. Seton Identification Products.
2. Substitutions: Specified in Section 016000 - Product Requirements.

B. Description:
1. Laminated Mylar construction.
2. Minimum Size: 1.9 by 0.75 inches.
3. Adhesive backed, with printed identification.

2.04 LOCKOUT DEVICES

A. Lockout Hasps:
1. Manufacturers:
    a. Brady ID.
    b. Master Lock Company, LLC.
    c. Or equal.
2. Description:
    a. Material: Anodized aluminum.
    b. Furnish hasp with erasable label surface.

B. Valve Lockout Devices:
1. Manufacturers:
    a. Brady ID.
    b. Master Lock Company, LLC.
    c. Or equal.

2. Description:
    a. Material: Steel.
    b. Furnish device to restrict access to valve operator and to accept lock shackle.

PART 3 - EXECUTION

3.01 PREPARATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.

B. Degrease and clean surfaces to receive adhesive for identification materials.

C. Prepare surfaces as specified in Section 099000 - Painting and Coating for stencil painting.

3.02 INSTALLATION

A. Apply stencil painting as specified in Section 099000 - Painting and Coating.

B. Install identifying devices after completion of coverings and painting.

C. Install plastic nameplates with corrosion-resistant mechanical fasteners or adhesive.

D. Labels:
1. Install labels with sufficient adhesive for permanent adhesion and seal with clear lacquer.
2. For unfinished covering, apply paint primer before applying labels.

E. Piping:
1. Identify piping, concealed or exposed, with plastic pipe markers, plastic tape pipe markers, or stenciled painting.
2. Use tags on piping 3/4-inch diameter and smaller.
3. Identify service, flow direction, and pressure.
4. Install in clear view and align with axis of piping.
5. Locate identification not to exceed 20 feet on straight runs, including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION

SECTION 407113

MAGNETIC FLOW METERS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified
   1. The work shall include all labor, tools, materials, equipment, services and incidentals to provide and install a magnetic flow meter as specified herein and as shown on the Contract Drawings.

B. Related Work Specified Elsewhere
   1. Section 012513 – Substitutions
   2. Section 013300 – Shop Drawing Procedures
   3. Section 013113 – Project Coordination
   4. Section 016500 – Transportation and Handling of Materials and Equipment
   5. Section 016600 – Storage of Material
   6. Section 017000 – Execution and Closeout Requirements

1.02 QUALITY ASSURANCE

A. References
   1. AWWA M6 - Water Meters - Selection, Installation, Testing, and Maintenance.
   2. AWWA M33 - Flowmeters in Water Supply.
   3. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.
   4. NSF 61 - Drinking Water System Components - Health Effects.
   5. NSF 372 - Drinking Water System Components - Lead Content.

B. Qualifications
   1. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five (5) years' experience.

C. Ensure that materials of construction of wetted parts are compatible with process liquid.

D. Materials in Contact with Potable Water: Certified to NSF 61 and NSF 372.

E. Perform Work according to Erie County Water Authority standards.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer information for system materials and component equipment, including layout and connection requirements.

B. Shop Drawings:
   1. Indicate system materials and component equipment.
   2. Submit installation requirements and other details.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Source Quality-Control Submittals: Indicate results of factory tests and inspections.

E. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

F. Manufacturer Reports: Certify that equipment has been installed according to manufacturer instructions.

G. Qualifications Statement:
   1. Submit qualifications for manufacturer.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

B. Store equipment according to manufacturer instructions.

C. Protection:
   1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
   2. Provide additional protection according to manufacturer instructions.

1.05 WARRANTY

A. Furnish three (3)-year manufacturer's warranty for magnetic flow meters and appurtenant devices that has been commissioned by a factory certified technician.

PART 2 - PRODUCTS

2.01 SYSTEM DESCRIPTION

A. Furnish sensors, field preamplifiers, signal conditioners, offset and span adjustments, amplifiers, transducers, transmitters, control devices, interconnecting cables, and unit conversions and algorithms as required for application.

2.02 MAGNETIC FLOW METERS

A. Manufacturers:
   1. Endress+Hauser Promag W 500.

B. Description: Low-frequency, electromagnetic induction-type flow meter, producing a linear signal directly proportional to flow rate, consisting of flow tube, signal cable, and transmitter.

C. Performance and Design Criteria:
   1. Design: According to AWWA M33.

D. Flow Rate Range: 88 to 18,000 gpm.

E. Size: As indicated on Drawings.

F. Flow Tubes:
   1. Material: Carbon steel with protective varnish and hard rubber liner.
   2. End Connections: Flanged, CI 150, A105 ASME B16.5, carbon steel.

G. Electrodes:
   1. Type 316L stainless steel.
   2. Self-cleaning.

H. Accuracy: Plus or minus 0.5 percent of actual flow rate.

I. Accessories:
   1. Furnish cable between transmitter and receiver.

2.03 TRANSMITTERS

A. Transmitter Output:
   1. 4- to 20-mA dc analog signal.

B. Housing Material: Cast aluminum.

C. HMI:
   1. Touch-screen programming, functioning through enclosure window without opening enclosure.
   2. Display:
      a. Size: Four lines by 16 characters.
      b. Type: Backlit digital display.
      c. User-selectable engineering units.
      d. Readout of diagnostic error messages.

D. Mounting:
   1. Integral or remote mounting up to 50 feet from flow meter.
   2. Mounting Locations Less Than 4 Feet above Grade: Provide stainless-steel mounting posts.

E. Transmitter Communication Interface: PROFIBUS.

F. Accessories:
   1. Current signal output simulation.
   2. Empty pipe detection.
   3. Self-diagnostics.
   4. Automatic zero adjustment.
   5. Stainless-steel sunshield.
   6. Signal Cable: Provided by flow meter manufacturer.

2.04 OPERATION

A. Control Power:
   1. Wiring: As specified in Section 260583 - Wiring Connections.
   2. 120-V ac, single phase, 60 Hz.
   3. Furnish local transformers as required.

B. Enclosures: NEMA 250 Type 4.

2.05 SOURCE QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for testing, inspection, and analysis.

B. Provide shop inspection and testing of meters according to AWWA M6.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.

B. Verify that items provided by other Sections of Work are ready to receive Work of this Section.

3.02 INSTALLATION

A. Coordinate location and orientation of flow meter with final equipment installations.

B. Ensure that instruments are located to be easily accessible for maintenance.

C. Testing:
   1. Test and calibrate flow meter to demonstrate that it meets specified accuracy requirements.
   2. Comply with AWWA M6.

D. Manufacturer Services: Furnish services of manufacturer's representative experienced in installation of products furnished under this Section for not less than 8 hours on Site for installation, inspection, startup, field testing, and instructing Owner's personnel in operation and maintenance of equipment.

E. Equipment Acceptance:
   1. Adjust, repair, modify, or replace components failing to perform as specified and rerun tests.
   2. Make final adjustments to equipment under direction of manufacturer's representative.

F. Furnish installation certificate from equipment manufacturer's representative attesting that equipment has been properly installed and is ready for startup and testing.

3.03 DEMONSTRATION

A. Demonstrate equipment startup, shutdown, routine maintenance, and emergency repair procedures to Owner's personnel.

END OF SECTION

SECTION 407326

PRESSURE TRANSMITTERS AND SWITCHES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Gage-pressure transmitters.
   2. Pressure switches.
   3. Differential pressure switches

1.02 RELATED SECTIONS

A. Section 260583 - Wiring Connections: Control power wiring requirements.

B. Section 400553 – Identification for Process Piping.

1.03 SUBMITTALS

A. Product Data: Manufacturer information for system materials and component equipment, including connection requirements.

B. Shop Drawings:
   1. System materials and component equipment.
   2. Installation requirements and other details.

C. Manufacturer's Certificate: Products meet or exceed specified requirements.

D. Source Quality-Control Submittals: Indicate results of factory tests and inspections.

E. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

F. Qualifications Statement
   1. Qualifications of the Manufacturer.

1.04 QUALITY ASSURANCE

A. Ensure that materials of construction of wetted parts are compatible with process liquid.

B. Materials in Contact with Potable Water: Certified to NSF 61 and NSF 372.

C. Perform Work according to Erie County Water Authority standards.

D. Manufacturer: Company specializing in manufacturing products specified in this Section with five (5) years' experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store materials according to manufacturer instructions.

B. Protection:
   1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
   2. Provide additional protection according to manufacturer instructions.

1.06 WARRANTY

A. Furnish two (2)-year manufacturer's warranty for gage-pressure transmitters.

PART 2 - PRODUCTS

2.01 GAGE-PRESSURE TRANSMITTERS

A. Manufacturers:
   1. Rosemount 3051C Pressure Transmitter
   2. Or equal.

B. Description:
   1. Excitation:
      a. 9- to 30-V dc.
      b. Overvoltage protected.
   2. Accuracy: Plus or minus 5 percent.
   3. Output Signal: 4 to 20 mA dc.
   4. Operating Temperature Range: 0to 80 degrees F.
   5. Materials: Type 316 stainless steel.
   6. Location: As indicated.

C. Mounting: Pipe.

D. Furnish cable, field preamplifiers, and signal conditioners as required to maintain accuracy from transducer to terminal device.

E. Operation:
   1. Control Power:
      a. Wiring as required.
      b. 120-V ac, single phase, 60 Hz.
      c. Furnish local transformers as required.
   2. Enclosures: NEMA Type 4X.

2.02 PRESSURE SWITCHES

A. Manufacturers:
   1. Square D – 9012 GAW-6
   2. Or equal.

B. Type: Electromechanical.

C. Materials:
1. Diaphragm: Buna-N.
2. Housing: Die Cast Aluminum Alloy 380.

D. Accuracy: Plus or minus 4 percent of operating range.

E. Connection:
1. Location: Bottom.
2. Size: 1/2 inch.
3. Furnish taps for sensing lines.

F. Electrical:
1. Contacts:
a. Four (4).
b. SPDT-DB.
c. Type: Form Z, snap action silver nickel
2. Ampacity: 6 A at 120-V ac.; 3 A at 240-V ac

2.03 DIFFERENTIAL PRESSURE SWITCHES

A. Manufacturers:
1. Square D – 9012 GGW-4
2. Or equal.

B. Type: Electromechanical Pressure Switch.

C. Materials
1. Diaphragm: Buna-N.
2. Housing: Die Cast Aluminum Alloy 380.

D. Connection:
1. Location: Bottom.
2. Size: 1/2 inch.
3. Furnish taps for sensing lines.

E. Differential Range:
1. Adjustable.
2. Maximum: 0 psi at low end.
3. Minimum: 175 psi at high end.

F. Accuracy: Plus or minus 4 percent of full-scale range.

G. Maximum Operating Pressure: 240 psi.

H. Transmitter: Operable with low-pressure connection disconnected.

2.04 SOURCE QUALITY CONTROL

A. Provide shop inspection and testing of completed assembly.

B. Certificate of Compliance:
   1. If manufacturer is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at manufacturer's facility conforms to Contract Documents.
   2. Specified shop tests are not required for Work performed by approved manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that items provided by other Sections of Work are ready to receive Work of this Section.

3.02 INSTALLATION

A. According to manufacturer instructions.

3.03 FIELD QUALITY CONTROL

A. Equipment Acceptance: Adjust, repair, modify, or replace components failing to perform as specified and rerun tests.

3.04 DEMONSTRATION

A. Demonstrate equipment startup, shutdown, routine maintenance, and emergency repair procedures to Owner's personnel.

END OF SECTION

SECTION 407521 – CHLORINE ANALYZERS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Analytical instruments for process instrumentation, auxiliary equipment, and supplies directly related to the installation of and operation of these analytical instruments, to perform the required functions in conjunction with the drawings.

B. Related Requirements:
   1. Section 260503 – Equipment Wiring Connections: Wiring connections to equipment.
   2. Section 260526 – Grounding and Bonding for Electrical Systems
   3. Section 262716 – Electrical Cabinets and Enclosures.

1.02 REFERENCE STANDARDS

A. National Electrical Manufacturers Association:
   1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
   2. NEMA ICS 4 – Industrial Control and Systems: Terminal Blocks.

1.03 SUBMITTALS

A. Section 013300 – Shop Drawing Procedures: Requirements for submittals.

B. Product Data: Submit manufacturer information for system materials and component equipment, including electrical characteristics and connection requirements.

C. Shop Drawings:
   1. Indicate size and configuration of assembly, mountings, weights, and accessory connections.
   2. Indicate system materials, component equipment, wiring diagrams, and schematics.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.

F. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

G. Manufacturer Reports: Certify that equipment has been installed according to manufacturer instructions.

1.04 MAINTENANCE MATERIAL SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance materials.

B. Spare Parts:
1. All systems are to be supplied with one (1) package of ten (10) membranes, one (1) 120 cc bottle of electrolyte, & one (1) spare parts kit containing three (3) each of all o-rings & special screws.

C. QUALIFICATIONS
1. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five years' documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Section 016500 – Transportation and Handling of Materials and Equipment: Requirements for transporting and handling products.

B. Section 016600 – Storage of Material: Requirements for storing and protecting products.

C. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

D. Store materials according to manufacturer instructions.

E. Protection:
1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Provide additional protection according to manufacturer instructions.

1.06 WARRANTY

A. Section 017000 - Execution and Closeout Requirements: Requirements for warranties.

B. Furnish two year manufacturer's warranty from acceptance of work for analyzers.

PART 2 - PRODUCTS

2.01 RESIDUAL CHLORINE (TEMPERATURE AND pH) MONITOR

A. Manufacturers:
1. ATi Model Q46H-62 Residual Chlorine Monitor (Q46H-62-1-1-3-1-2-2)
2. Substitutions: None.

B. Description: On-line chlorine monitor to continuously measure free chlorine with a direct measuring chlorine sensor, and simultaneous output of both free chlorine, pH, and temperature.

C. Ordering Information:
   1. Measurement Type: 62 – Free Chlorine
   2. Power: 1 – 100-240 VAC, +/-10%, 50/60 Hz
   3. Sensor Style: 1 – Sensor with constant head flowcell and 25 ft cable (length per installation requirements)
   4. pH Sensor Input: 3 – Standard pH Sensor with 25 ft cable (length per installation requirements) and adapter for overflow call
   5. Digital Output: 1 – None
   6. Optional Output: 2 – One additional 4-40mA output
   7. System Assembly: 2 – Panel with flow controls, without flow switch
   8. Mounting plate without flowswitch (03-0374).

D. Pressure Limit: 0-50 PSIG

E. Inlet: ¼" I.D. tubing

F. Outlet: ½" O.D. tubing

G. 3 analog outputs (4-20mA) for chlorine, pH, and temperature.

H. Flowcell for Cl_2 / pH combo systems should be kept within 25 ft of monitor.

I. Buffer pack for pH 4 & 7 to be supplied.

PART 3 - EXECUTION

3.01 INSTALLATION

A. According to manufacturer instructions.

3.02 FIELD QUALITY CONTROL

A. Section 017000 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.

B. Testing: Test and calibrate analyzer to demonstrate that it meets specified accuracy requirements.

C. Equipment Acceptance:
   1. Adjust, repair, modify, or replace components failing to perform as specified and rerun tests.

3.03 DEMONSTRATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for demonstration and training.

B. Demonstrate operation, routine maintenance, alarm condition responses, and emergency repair procedures to Owner's personnel.

END OF SECTION

SECTION 432331

VERTICAL TURBINE PUMP

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. This section defines the minimum requirements for vertical turbine pumps, including, but not limited to, the following:
   1. Materials of Construction

B. Hydraulic Conditions
   1. Electrical Requirements

1.02 RELATED SECTIONS

A. Division 26 – Electrical

B. Division 33 - Utilities

1.03 REFERENCES

A. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
   1. Standards of the Hydraulic Institute.
   2. National Electric Code.
   3. Standards of National Electrical Manufacturers Association.
   4. Institute of Electrical Electronic Engineers.
   5. American National Standards Institute.
   6. Standards of American Society for Testing and Materials.
   7. Standards of the American Water Works Association.
   8. Standards of the American Bearing Manufacturer's Association.
   9. Recommended Standards for Water Works.

1.04 QUALITY ASSURANCE

A. To ensure that all the equipment required is properly coordinated and will function in accordance with the intent of these Specifications, the CONTRACTOR shall obtain all (pump, motor, , etc.) the equipment specified under the various subdivisions of this Section from the pump manufacturer in whom the responsibility for the proper function of all the equipment as an integrated and coordinated unit shall be vested. The intent of this paragraph is to establish unit responsibility for all the pump and motor equipment with the pump manufacturer. The use of the word "responsibility" relating to the pump manufacturer is in no way intended to relieve the CONTRACTOR'S ultimate responsibility under this Contract for equipment coordination, operation and guarantee.

B. Manufacturer's Qualification:

1. Equipment provided shall be the standard product in regular production by manufacturers whose products have proven to be reliable in similar service for at least ten years. All pump equipment under this specification shall be supplied by one (1) manufacturer to facilitate maintenance and repair of equipment. The vertical turbine manufacturer shall be certified in accordance with the requirements of ISO 9001 and shall provide written proof of certification.

C. Pump Factory Shop Tests:

1. A minimum of one (1) shop performance tests shall be performed on each pump. Each pump bowl assembly shall be performance tested in accordance with the latest Hydraulic Institute standards for vertical turbine pumps and to ensure compliance with the stated requirements of this specification.
2. Pump Casings shall be hydrostatically tested to twice the design head or one-and-a-half times the shutoff head for the current operating conditions; whichever is greater. Design and shutoff heads are specified in Paragraph 2.1-A of this Section.
3. Performance Test: The pump assembly shall be operated from zero to maximum capacity as shown on the initial standard pump curve included in the approved Shop Drawing. Results of the certified shop test shall be shown in a plot of test curves showing head, flow, brake horsepower, pump efficiency, and current. Readings shall be taken at a minimum of six-(6) evenly spaced capacity points including shutoff, design point, and minimum head at which the pump is designed to operate.
4. The pumps shall each be assembled and tested using one of the actual supplied motors for the project and with factory variable frequency drives that are available at the pump manufacturer's facility. The actual wire-to-water efficiency of the pump shall be computed and compared to the guaranteed wire-to-water efficiency at each design point as stated in the approved Shop Drawing.
5. If the shop performance test indicates that the pump does not conform to specified and/or guaranteed performance, the unit shall be modified and re-tested at no additional cost to the OWNER until full compliance with the specified and guaranteed performance is demonstrated.
6. For the shop performance tests the pump shall be run for at least 30 minutes at the rated condition before any readings are obtained.
7. There shall be no minus tolerance with respect to capacity, total head, and pump efficiency at the design point conditions. Pump performances shall be within the following tolerances:
    a. At specified head conditions: +6 percent of specified capacity.
    b. At specified capacity conditions: +10 percent of specified head conditions.
8. Pump efficiency shall be based on normal wearing ring clearances and not on minimum clearances obtained only during initial operation. No deducts from the specified efficiency will be allowed.

9. Each pump shop performance test shall be witnessed by a Licensed Professional Engineer, who may be an employee of the manufacturer. He/she shall sign and seal all copies of curves and shall certify that shop performance tests were performed. Three (3) original copies of the pump performance curves shall be submitted to the ENGINEER for approval prior to the pumps leaving the manufacturing facility.
10. Pumps shall not be shipped until the ENGINEER has approved the test reports.

1.05 SUBMITTALS

A. The CONTRACTOR shall submit at the time of the bid opening, within the sealed envelope containing the Bid Documents, the following literature and Shop Drawings for approval in accordance with these specifications:
   1. Descriptive literature for the pumps showing size, general arrangements, standard pump curve, materials of construction for all components, dimensions, weight of the complete pump/motor assembly and of pump and motor alone, and other important details.
   2. Descriptive literature for the motors showing general arrangement, materials of construction, insulation, dimensions, and other important details including, but not limited to the following:
      a. Motor horsepower.
      b. Motor efficiency.
      c. Motor full load current.
      d. Motor locked rotor current.
   3. Standard pump performance curves showing head - capacity relationship, brake horsepower, NPSH, overall pump efficiency, and pump speed. The curves shall be complete for the entire range of operation from shutoff to minimum head conditions.

B. Upon award of the Contract, the CONTRACTOR shall submit the following literature and Shop Drawings for approval in accordance with these specifications:
   1. Factory Certified pump performance curves of the actual pumps being supplied, showing head - capacity relationship, brake horsepower, NPSH, overall pump efficiency, and pump speed. The curves shall be complete for the entire range of operation from shutoff to minimum head conditions.
   2. Drawings and Data: Complete fabrication, assembly, foundation, and installation drawings, certified pump performance curves, and operation, maintenance, and storage instructions, together with detailed specifications and data covering materials used, power drive assembly, parts, devices, and other accessories forming a part of the equipment furnished, shall be submitted for review in accordance with the procedures and requirements set forth in the Contract Documents. Generic or standard cut sheet drawings will not be acceptable.

3. A report summarizing the results of the natural frequency (head lateral) analysis of the pumping unit (discharge head and motor) shall be submitted to the ENGINEER, and shall include, at a minimum, the following information:
    a. Computer program used to model the installation
    b. Motor speed critical frequency and critical speed information or motor dynamic analysis.
    c. analysis results, including all significant natural frequencies.
    d. No dangerous critical or resonant frequencies or multiples of resonant frequencies within 20 percent above and 20 percent below the speed range required by the pump to meet the specified operating conditions.
4. Field alignment report including but not limited to the following pump to motor alignment data:
    a. angular alignment
    b. axial or parallel alignment
    c. proper coupling gap
5. Complete installation drawings including setting drawings which indicate the location, arrangements and size for all anchor bolts required for the pumping units and base plate installation and fabrication details.
6. Pump manufacturer's representative shall review the conditions of installation including pump locations and arrangements and approve such prior to submittal.
7. Three (3) sets of Operation and Maintenance Manuals including complete installation, operation and maintenance data with copies of all approved Shop Drawings. Information provided shall include, but not be limited to the following:
    a. Complete, detailed written operating instructions for each product or piece of equipment including: equipment function; operating characteristics; limiting conditions; operating instructions for startup, normal and emergency conditions; regulation and control; and shutdown.
    b. Recommended spare parts list and local sources of supply for parts.
    c. Written explanations of all safety considerations relating to operation and maintenance procedures.
    d. Name, address and phone number of manufacturer, manufacturer's local service representative.
    e. Preventive maintenance instructions including, but are not limited to, the following:
        1) A written explanation with illustrations for each preventive maintenance task.
        2) Recommended schedule for execution of preventive maintenance tasks.
        3) Lubrication charts.
        4) Table of alternative lubricants.
        5) Trouble-shooting instructions.
        6) List of required maintenance tools and equipment.

8. Guarantee of performance and parts per Section 1.06 below.

1.06 GUARANTEE

A. The time of the guarantee shall be for a period of two (2) years after the date that the CONTRACTOR'S final payment comes due.

B. In addition to the guarantee, CONTRACTOR shall include the services of a factory-trained serviceman to provide repair service for the equipment for the period of one (1) year commencing with the date that the CONTRACTOR'S final payment comes due. This service shall include the cost of all replacement parts required during the interval.

PART 2 - PRODUCTS

2.01 SERVICE CONDITIONS

A. Pump shall be a close-coupled, product lubricated vertical turbine can pump and shall consist of the pump bowl assembly, discharge head, coupling, motor and suction barrel.

Pump Design Conditions (Full Speed)	
Number of Pumps	Two (2)
Type of Operation on VFD	Instant Speed
Design Point 1	
Flow at Reduced Speed	1,500 gpm
TDH at Reduced Speed	102.36 ft.
Minimum Pump Efficiency	74%
Design Point 2	
Flow at Full Speed	2,100 gpm
TDH at Full Speed	106.4 ft.
Minimum Pump Efficiency	78%
Minimum Shut off head, feet	146.1
Impeller Type:	Enclosed
Maximum Motor Speed, RPM	1,770
Minimum motor rating, HP	100
Minimum full load motor efficiency, %	95.4
Minimum pump efficiency, %	78.42
Minimum wire to water efficiency, %	73.1
Maximum NPSH Required (ft)	15.72
Maximum Number of Stages	1
Suction connections, inches	16
Discharge connections, inches	10
Minimum Suction Barrel/Can Length (feet):	6.78
Maximum Bowl Assembly Length (feet):	1777
Liquid pumped	Potable Water
Liquid temperature range	32°F to 80°F

B. Pump shall be designed to perform satisfactorily when operating continuously in typical municipal water work service.

2.02 DETAILS OF PUMP CONSTRUCTION

A. Materials of construction shall be in conformance with applicable ANSI standards. The following materials or equivalent alternates for the service conditions, as determined by the ENGINEER, shall be provided:

Bowl Assembly	Epoxy lined Cast Iron, ASTM A48, Class 30
Impellers	316, Stainless Steel, ASTM A743
Collets	Carbon Steel, ASTM A108
Wear Rings	Nickel Aluminum Bronze; ASTM B148
Bowl Shaft	416, Stainless Steel; ASTM A582
Lineshaft	416, Stainless Steel; ASTM A582
Bowl Bearings	Bismuth Tin Bronze, UNS C89835
Shaft Sleeve	304 Stainless, ASTM A269
Fabricated Discharge Head	ASTM A-53 Steel, A-36, and A-105 or A-181
Suction Barrel	ASTM A-53 Steel, A-36, and A-105 or A-181

B. Bowl Assembly

1. The pump bowls shall be of close-grained cast iron type ASTM A48, class 30, designed for heavy-duty service. Bowl assembly shall be free of blowholes, sand holes and other detrimental defects, and shall be accurately machined and fitted.
2. The bowl assembly shall be equipped with a suction bell.
3. The OD of the bowl assembly shall be sprayed with an NSF approved coating, such as Carboline Carboguard 891 epoxy or approved equal. All metal shall be adequately prepared prior to the application of any coatings to ensure a good bond.

C. Impellers

1. Impellers shall be made of stainless steel and suitable for use with chlorinated water, and shall be enclosed design both statically and dynamically balanced. All impellers shall be of equal diameter. Pump impellers shall not exceed 90% of the maximum allowable impeller diameter for the particular pump. Full diameter and semi-open impellers are not acceptable.
2. All impeller vanes shall be filed to ensure a uniform dimension of the vanes. Impeller shall be sized so the pump design points shall be within the preferred operating region per Hydraulic Institute 9.63 (between 70% and 120% BEP).
3. The impellers shall be securely fastened to the shaft with tapered collets constructed of carbon steel.
4. The performance curve shall have a continuously rising curve without any dips or reversals. The rise to shutoff shall be at least 15 percent greater than the operating head of the pump.

D. Bowl Shaft

1. Bowl shaft shall be A582 grade 416 stainless steel turned, ground and polished. The bowl shaft shall extend fully through the stuffing box with minimal turndown in the seal area.
2. The shaft shall be supported by bismuth tin bronze bearings suitable for the pump liquid above and below each impeller. Bearings shall be suitable for the product being pumped. All bearings shall be product lubricated by the pumped liquid.
3. The suction case bearing shall be grease lubricated and protected by a stainless steel sand collar.
4. The first critical speed of the rotating assembly shall occur at not less than 125 percent above or below the specified performance envelope of the pump.

E. Discharge Head

1. The discharge head shall be constructed to accommodate current and future flow conditions and motor sizes.
2. The discharge head shall be fabricated of carbon steel using ANSI RF flanges, ASTM A53 Grade B body pipe and ASTM 36, steel plate with the suction and discharge flanges inline with each other and located 180 degrees apart.
3. Suction flange shall be 16-inch class 300 flat faced. Discharge flange shall be 10-inch class 300 raised face. Holes shall straddle the vertical centerline.
4. The pump manufacturer shall perform a dynamic analysis; specific for this installation, to ensure the unit(s) will operate with undue vibration over the entire operating range and submitted in accordance with Contract specifications. Unit vibration (current and future service) shall not exceed .16 inches/sec of displacement at any operating point from 50 percent to 100 percent operating speed and within the preferred operating range of the pump BEP. All readings shall be unfiltered. Use of lockout speeds on the variable speed drive to address natural frequency of the pumping unit will not be allowed.
5. 1/4-inch NPT taps shall be supplied on the suction and discharge pipes as indicated on the Contract Plans. A 3/4-inch NPT barrel vent shall be located on the outer casing on the discharge head.
6. Adequate discharge head height shall be supplied to accept a mechanical seal arrangement and a flanged adjustable spacer coupling.

F. Suction Barrel

1. The suction barrel supplied shall be sized and suitable for both current and future flow conditions, as specified in Paragraph 2.01, without modification to the barrel or loss of performance.
2. The suction barrel shall be in accordance with the latest Hydraulic Institute Standards; ANSI/HI 9.8.
3. A fabricated suction barrel of the same material as the discharge head shall be capable of withstanding the maximum suction pressure supplied to the suction flange.

4. The bottom end of the suction barrel shall be supplied with a welded plate cap. Minimum barrel wall thickness shall be 0.365 inches.
5. The barrel shall be supplied with a square base plate, which shall be machined and tapped to match the discharge head base flange. The base shall be drilled to allow the barrel to be secured in place with anchor bolts.
6. A ¾-inch NPT tap shall be provided at the base of the suction barrel to allow for complete draining of the barrel.
7. An O-ring seal or gasket shall be furnished between the barrel flange and discharge head base flange.
8. Interior of the barrel shall be sprayed with an NSF approved coating such as Carboline Carboguard 891 epoxy or approved equal. All metal shall be adequately prepared prior to the application of any coatings to ensure a good bond.
9. Exterior of the barrel shall be sprayed with a Carboguard 891 or approved equal. All metal shall be adequately prepared prior to the application of any coatings to ensure a good bond.
10. All mounting surfaces shall have a machined finish.

G. Couplings: Pump shall be connected to the drive motor by threaded coupling capable of withstanding all torsional, radial, and axial loads.

H. Nameplates: Each pump shall be furnished with a stainless steel nameplate with stamped characters. The nameplate shall give the pump rating in gallons per minute, rated head in feet, speed and pump serial number. Nameplates shall be securely attached in a conspicuous location and shall NOT BE PAINTED OVER.

I. Products and Manufacturers
1. Provide complete pump/motor assemblies from one of the following pump manufacturers:
   a. Flowserve.
   b. Floway Pumps (Division of Weir Minerals).
   c. Layne and Bowler.
   d. Peerless.

2.03 MOTORS

A. Motors shall be premium efficiency.

B. Motor shall be inverter duty labeled for use with variable frequency drives.

C. Motors shall be high thrust, premium efficiency, TEFC, vertical solid shaft, P-Base, squirrel cage induction type. Minimum nominal efficiency at full load shall be 95 percent. Motor power factor at full load shall be 86.5 percent or greater.

D. Maximum nominal motor RPM shall be 1780.

E. The motor shall be provided with a non-reverse ratchet to prevent reverse rotation of the pump.

F. The motor shall be equipped with high temperature grease-lubricated, air-cooled, anti-friction bearings having a minimum L_{10} life of 50,000 hours as defined by ABMA.

G. The thrust bearing shall be chosen to handle the continuous down thrust as specified by the pump manufacturer with an ABMA B-10 one-year minimum or five-year average life under design conditions.

H. The motors shall be designed, constructed and tested in accordance with current applicable requirements of NEMA, IEEE and ANSI standards. They shall be structurally and mechanically coordinated with the pump and sized for the future flow condition.

I. Electrical characteristics shall be 460 volts, 3 phase, 60 Hz. Locked rotor KVA rating shall conform to the requirements of NEMA Code Letter B. Windings shall be copper. Include grounding provisions within the conduit box.

J. Motor shall meet the latest NEMA MG-1 part 31 standards with Class F inverter grade insulation, special build insulation on magnet wire, increased phase to phase insulation and special end turn bracing.

K. The motor windings shall be equipped with bi-metallic heat sensors to cease motor operation when an over-temperature condition is sensed. The sensors shall be connected in series and mounted directly to the motor windings. A minimum of two sensors shall be provided. The sensors shall be wired in the motor control circuit and be manually reset.

L. Motor shall have a service factor of 1.15 on sine wave power.

M. Motor housing shall be ribbed cast iron construction.

N. Each motor and all components shall receive one priming coat and two (2) finish coats of manufacturer's standard enamel paint system.

2.04 BASIS OF DESIGN

A. Floway 16 KJM 1 stage vertical turbine barrel pump with 100 Hp motor.

2.05 CONTROL FUNCTIONS

A. To be determined and included in future submission.

2.06 TOOLS, SPARE PARTS AND MAINTENANCE MATERIALS

A. Each pump shall be furnished with the following:
   1. One set of all gaskets or o-rings
   2. Special tools required for maintenance or operation (one set only required)

3. A complete set of all fasteners, bolts, nuts, pins, keys, washer and the like which are not of standard manufacture, readily available locally or stock by the manufacturer for delivery within 24 hours.
4. All bearing grease and any other lubricants required for initial operation, properly labeled and boxed.

B. Spare parts shall be supplied in sturdy containers with clear indelible identification markings. They shall be stored in a dry, warm location until transferred to the OWNER at the conclusion of the Project.

2.07 PAINTING

A. Pump, frame, base plate, appurtenances, etc. shall receive manufacturer's standard finish paint system prior to shipment.

B. Machined, polished and nonferrous surfaces shall be coated with corrosion prevention compound.

C. All scratches and abrasions shall be touched up in the field in accordance with the manufacturer's instructions.

D. All coatings shall be compliant with NSF standards for use in potable water..

E. All equipment and components defined shall receive one prime coat and two finish coats of the manufacturer’s standard paint as per section 09900 or the manufacturer’s standards, whichever is more stringent.

PART 3 - EXECUTION

3.01 INSPECTION

A. Duly authorized representatives of the OWNER and the ENGINEER shall be at liberty at all times to inspect the manufacturer of all components at the respective manufacturing plant. However, such inspection shall not relieve the CONTRACTOR of furnishing materials conforming to these Specifications. The CONTRACTOR shall submit Certificate of Compliance that all tests and inspections were made and that the materials furnished conform to the Specifications in all respects.

3.02 CARE IN HANDLING EQUIPMENT

A. The CONTRACTOR shall be responsible for equipment furnished, delivered, and installed, and equipment that is defective in any way shall be rejected and replaced at his own expense. Methods and equipment for moving equipment to the Site shall be such as to prevent injury to materials, protective linings and coatings.

3.03 EQUIPMENT INSTALLATION

A. General

1. CONTRACTOR shall coordinate all aspects of the Work and perform all operations required for the proper installation of the pumps and equipment including, but not limited to, piping, mounting, alignment, shimming and leveling, electrical connections, and the addition of all fluids or lubricants required. Any other miscellaneous work required for proper installation.
2. Installation shall be in full accordance with the manufacturer's Shop Drawings, written and verbal instructions and recommendations, and as directed by ENGINEER. Each piece of equipment shall be installed, adjusted, lubricated, and made completely ready in all respects for operation.
3. Pump packing and seal water shall be piped to drain to floor and/or trench drains with type “k” copper or stainless steel tubing.
4. It shall be the sole and mutual responsibility of each manufacturer and the CONTRACTOR to coordinate their operations during installation. The OWNER shall not be liable to the CONTRACTOR for any increased compensation, claim, damage, loss or expense sustained by the CONTRACTOR or by the manufacturer, due to delay in delivery of the equipment. Additional time may be granted to the CONTRACTOR in accordance with the Contract Documents.
5. The CONTRACTOR shall employ competent mechanics experienced in the installation of the type of equipment furnished. All temporary supports, which are required to complete the installation, shall be furnished by the CONTRACTOR under this Section.
6. Make all final alignments, lubrication, adjustments, verification and reporting required to place equipment in proper operating condition, as recommended by manufacturer.
7. CONTRACTOR shall complete all start-up and field testing procedures as specified herein.

B. Adjustable Speed Drives

1. Unit(s) shall be handled and stored in accordance with the manufacturers written instructions.
2. Each unit shall be securely fastened to the floor utilizing appropriate anchors, nuts, and bolts. Unit enclosures shall not be field welded in any fashion.
3. The unit shall be mounted with the highest operator device no more than 5-feet 6-inches above the finished floor.
4. Each unit shall be properly grounded per the NEC.
5. Close, using proper seals, all unused openings and/or penetrations to maintain the enclosure NEMA rating.

3.04 START-UP ASSISTANCE

A. The CONTRACTOR shall furnish the services of a qualified, factory certified and trained representative of the manufacturer to inspect the pump and motor installation and certify that the installation is adequate and acceptable prior to operation of each unit. In addition, the representative shall witness on-Site start-up and testing of each unit. OWNER shall be present during start-up procedures.

B. A complete service report shall be filled out and signed by the factory service representative and a representative of the OWNER and ENGINEER. Five (5) copies of the start-up report will be furnished.

C. CONTRACTOR shall pay the per diem charges of manufacturers' service representatives if additional service is required due to improper installation or failure of CONTRACTOR to have proper forces available during a scheduled service call. CONTRACTOR shall not be responsible for additional service calls due to defects in equipment or materials furnished by OWNER.

D. CONTRACTOR shall give sufficient notice to the OWNER prior to the start of installation work and prior to placing the equipment in service so that arrangements can be made for the scheduled service calls.

END OF SECTION

APPENDIX A

WOMEN AND MINORITY BUSINESS ENTERPRISE POLICY

ERIE COUNTY WATER AUTHORITY

APPENDIX B

ERIE COUNTY WATER AUTHORITY

ERIE COUNTY WATER AUTHORITY
(Insurance Specifications for Construction Related Contracts)

[THIS FORM IS INTENDED TO BE USED AS AN EXHIBIT OR ADDENDUM TO YOUR PRIMARY CONTRACT—IT SHOULD NOT BE USED BY ITSELF AS A SOLE CONTRACT DOCUMENT]

OWNER - CONTRACTOR ADDENDUM AGREEMENT

This Owner – Contractor Addendum Agreement ("Addendum Agreement") is being entered into by the parties for any and all work done for, with, or on behalf of **[Insert name of Owner], ("Owner"**) by [**Insert name of Contractor] ("Contractor")** as an Addendum Agreement to the primary contract entered into by the parties, a copy of which is attached hereto (referred to hereafter as "Primary Contract" and which includes any written agreement by the parties, including but not limited to any purchase order, proceed order or written estimate).

During the term of an Agent Agreement and/or a Lease Agreement entered into with the Erie County Water Authority an **ACORD25-Certificate of Liability Insurance** and **ACORD 855 NY-NY Construction Certificate of Liability Addendum** shall be provided evidencing the following insurance is currently maintained and in force with an insurance carrier approved to do business in the State of New York and maintaining an A.M. Best Rating of A- or better showing Erie County Water Authority as Certificate Holder. It is our suggestion that you share these requirements with your current insurance agent, broker or insurance company.

Insurance Requirements

Prior to the commencement of any work designated in this Addendum Agreement or in any contract or agreement to which this Addendum Agreement is attached, and until final completion and acceptance of the work, the Contractor, at its sole expense, shall maintain the following minimum insurance on its own behalf, and furnish to the Owner certificates of insurance evidencing same and reflecting the effective date of such coverage as listed below. In no event shall the failure to provide this proof, prior to the commencement of the work, be deemed a waiver by the Owner of the Contractor's obligation to maintain the insurance set forth herein. The insurance required shall not be canceled, not renewed or materially changed subsequent to the issuance of the certificate of insurance required by this Addendum Agreement.

A. Worker's Compensation, Occupational Disease & Employer's Liability Insurance:

Worker's Compensation, Occupational Disease & Employer's Liability Insurance in accordance with the applicable laws and statutes to cover any injuries or illness to employees and any other person eligible for compensation, and the liability of the employer thereof to any person or organization, as follows:

Worker's Compensation & Occupational Disease: Statutory

Employer's Liability: $1,000,000 bodily injury by accident or disease, except for work work/employers subject to the New York Worker's Compensation Law, in which this insurance shall be unlimited.

All such coverage shall: not contain any exclusion for injuries to sole proprietors, partners, members of limited liability companies or executive officers of any corporate entity; and provide for a "Waiver of Subrogation" endorsement in favor of the Owner/Contractor.

Any contractor/subcontractor with a principal place of business located outside of the State of New York must include New York under Part 3A of the policy.

B. <u>Commercial General Liability</u>:

Commercial general liability insurance as provided under the ISO Commercial General Liability Coverage Form, CG 00 01, or its equivalent, for claims of Bodily Injury, Property Damage and Personal and Advertising Injury, with limits of not less than:

Per Occurrence and Personal & Advertising Injury-	$1,000,000.00
General Aggregate & Products/Completed Operations Aggregate-	$2,000,000.00
Fire Damage Legal Liability/Damage to Rented Property-	$100,000.00
Medical Payment (per-person)	$5,000.00

The coverage must include the following:

1. Liability assumed by the insured in an "insured contract" as that term is defined in the ISO Commercial General Liability Coverage Form, CG 00 01.

2. Products/Completed Operations liability for a period of three years after acceptance of the work.

3. A per project aggregate of $2,000,000.00.

4. A "Waiver of Subrogation" Endorsement in favor of the Owner/Contractor.

5. Exterior Insulation Finish System ("EFIS") coverage must be specifically included or provided separately where the Contractor/Subcontractor work under this Agreement or in any contract or agreement to which this Addendum is attached in any way involves EFIS.

6. **The coverage shall not include any provision, definition, exclusion or endorsement which in any way would serve to eliminate the insurance to any insured or additional insured for liability for bodily injury or property damage arising from work performed in New York State, for claims made under the New York Labor Law or for claims made by employees, subcontractors and employees of subcontractors hired to perform work by any insured or additional insured pursuant to work that is subject to this Addendum Agreement or in any contract or agreement to which this Addendum Agreement is attached.**

7. The insurance is to be provided through insurers licensed and admitted to do business in the State of New York, with an A. M. Best financial rating of "A-" or better, or otherwise specifically approved by the Owner.

The Owner, its officers, directors, partners, representatives, agents and employees must be named as Additional Insureds on a primary and non-contributory basis on both the ongoing and completed operations coverage required herein utilizing the ISO endorsements: CG 2010 04 13 or CG 2038 04 13 (or their equivalent) for ongoing operations; and CG 2037 04 13 (or its equivalent) for completed operations. The Additional Insured coverage shall contain no special limitation or limitation on the scope of the protection afforded to the Additional Insureds.

C. Commercial Automobile Liability Insurance:

Commercial Automobile Liability insurance covering the ownership, maintenance and use of all Owned, Non-Owned and Hired Vehicles by the Contractor with combined Bodily Injury and Property Damage limits including pollution transit coverage of $1,000,000.00 per accident. The Owner, its officers, directors, partners, representatives, agents and employees must be named as Additional Insureds on a primary and non-contributory basis. A "Waiver of Subrogation" in favor of the Owner must be included.

D. Commercial Umbrella/Excess Liability Insurance:

Commercial Umbrella/Excess Liability Insurance with limits of $5,000,000.00 per occurrence and a $5,000,000.00 aggregate. The Owner, its officers, directors, partners, representatives, agents and employees must be named as Additional Insureds on a primary and non-contributory basis. A "Waiver of Subrogation" in favor of the Owner must be included.

E. Pollution Liability:

Pollution liability coverage applicable to the type of work/operations being performed in the amount of $5,000,000.00 per occurrence and $5,000,000.00 aggregate limit. The Owner, its officers, directors, partners, representatives, agents and employees must be named as Additional Insureds on a primary and non-contributory basis. A "Waiver of Subrogation" in favor of the Owner must be included.

F. Builder's Risk/Installation Floater:

"All Risk" Property Insurance coverage afforded by a Builder's Risk/Installation Floater or its equivalent insuring all materials, equipment and supplies provided by the Contractor and intended to become a permanent part of the construction, whether stored on the premises, away from the project site and/or while in transit, in an amount equal to the replacement cost of such materials, equipment and supplies. A "Waiver of Subrogation" in favor of the Owner must be included.

G. Owned and/or Rented Tools or Equipment:

Property insurance covering all owned, rented, leased and/or borrowed tools or equipment of the Contractor or the Contractor's Subcontractors used in connection with the work that is subject to this Agreement or to any contract or agreement to which this Addendum is attached, in an amount equal to the replacement cost of such tools or equipment. A "Waiver of Subrogation" in favor of the Owner must be included.

JOB-SITE SAFETY:

The Owner makes no representation with respect to the physical conditions or safety of the Project Site. The Contractor shall, at its own expense, protect from injury its employees engaged in the performance of the Work. The prevention of accidents to all workers engaged in the Contractor's work and others affected by the Contractor's work is the responsibility of the Contractor. Contractor shall comply with all applicable federal, state, labor and local laws, regulations and codes concerning safety.

WORKERS COMP IMMUNITY WAIVER:

In any and all claims against the Owner by any employee of the Subcontractor, anyone directly or indirectly employed by the Contractor (including any of the Contractor's subcontractors) or anyone for whose acts the Contractor may be liable, the indemnification obligation shall not be limited in by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

HOLD HARMLESS / INDEMNIFICATION:

To the fullest extent permitted by law, Contractor shall defend, indemnify and hold harmless Owner and its heirs, executors, administrators, successors, assigns, affiliates, employees and agents ("Owner Indemnitees") from and against any and all actions, claims, liabilities, damages, losses and expenses, including but not limited to bodily injury, death and property damage, and reasonable attorney's fees and costs (including those incurred in the defense of any such underlying claim, as well as those incurred in the enforcement of this Addendum Agreement and/or in the prosecution of any claim for indemnification by Owner) arising out of or resulting from, or alleged to arise out of or result from, the Contractor's work (including the work by any of the Contractor's subcontractors), except to the extent caused by the negligence or willful misconduct of any Owner Indemnitees.

MISCELLANEOUS:

In the event that any term or provision of this Addendum Agreement conflicts with or is otherwise inconsistent with any term or provision in the Primary Contract or any prior written agreement entered into between the parties, the terms and provisions contained herein shall govern and control.

This Addendum Agreement shall be binding upon and inure to the benefit of the parties hereto and their successors and permitted assigns. This Addendum Agreement, its terms and any claims arising therefrom, shall be interpreted and construed in accordance with the laws of the State of New York.

This Addendum Agreement may be executed via facsimile or email in any number of counterparts, all of which taken together shall constitute one and the same agreement. No waiver by a party of any breach by the other party of any of the provisions of this Agreement shall be deemed a waiver of any preceding or succeeding breach of the same or any other provisions hereof. No such waiver shall be effective unless in writing and then only to the extent expressly set forth in writing.

No modification or amendment of this Addendum Agreement shall be effective unless in writing and signed by both parties. If any term or provision of this Addendum Agreement shall to any extent be invalid or unenforceable, the remainder of this Addendum Agreement shall not be affected thereby and each provision of this Addendum Agreement shall be valid and enforceable to the fullest extent permitted by law.

Certificates of Insurance should be e-mailed to mmusarra@ecwa.org or mailed to Ms. Molly Jo Musarra, Claim Representative/Risk Manager Erie County Water Authority, 295 Main Street – Room 350, Buffalo, New York 14203-2494, or If you have any questions you can contact Ms. Musarra by e-mail or phone (716) 849-8465.

OWNER (Signature)	CONTRACTOR (Signature)
(Print name and title)	(Print name and title)
Date:	Date:

APPENDIX B-2

[THIS FORM IS INTENDED TO BE USED AS AN EXHIBIT OR ADDENDUM TO ANY SUBCONTRACT—IT SHOULD NOT BE USED BY ITSELF AS A SOLE CONTRACT DOCUMENT]

ADDENDUM AGREEMENT

This Addendum to the Agreement ("Addendum Agreement") between **[Insert name of Upstream Contractor or Upstream Subcontractor]** (hereinafter referenced as "Contractor") and **[Insert name of Downstream Subcontractor]** (hereinafter referenced as "Subcontractor") is being entered into by the parties for any and all work done for, with, or on behalf of **the Erie County Water Authority** (hereinafter the "Authority") under the Primary Contract No._____, Project No. _____ [**Insert Project Description**] with **[Insert name of Contractor]**, a copy of which may be obtained from **[Insert name and contract information of the entity]**.

In accordance with the terms and conditions of the Primary Contract No. _____ entered into with the Erie County Water Authority, an **ACORD25-Certificate of Liability Insurance** and **ACORD 855 NY-NY Construction Certificate of Liability Addendum** shall be provided evidencing the following insurance is currently maintained and in force with an insurance carrier approved to do business in the State of New York and maintaining an A.M. Best Rating of A- or better showing the Authority as Certificate Holder and additional insured. You should share these requirements with your current insurance agent, broker or insurance company.

Insurance Requirements

Prior to the commencement of any work designated in any contract or agreement to which this Addendum Agreement is attached, and until at least the final completion and acceptance of the work under the contract or agreement to which this Addendum Agreement is attached, the Subcontractor, at its sole expense, shall maintain the following minimum insurance on its own behalf, and furnish to the Authority certificates of insurance evidencing same and reflecting the effective date of such coverage as listed below. In no event shall the failure to provide this proof, prior to the commencement of the work, be deemed a waiver by the Authority of the Subcontractor's obligation to maintain the insurance set forth herein. The insurance required shall not be canceled, not renewed or materially changed after the issuance of the certificate of insurance required by this Addendum Agreement.

A. Worker's Compensation, Occupational Disease & Employer's Liability Insurance:

Worker's Compensation, Occupational Disease & Employer's Liability Insurance in accordance with the applicable laws and statutes to cover any injuries or illness to employees and any other person eligible for compensation, and the liability of the employer thereof to any person or organization, as follows:

Worker's Compensation & Occupational Disease: Statutory

Employer's Liability: $1,000,000 bodily injury by accident or disease, except for work work/employers subject to the New York Worker's Compensation Law, in which this

insurance shall be unlimited.

All such coverage shall: not contain any exclusion for injuries to sole proprietors, partners, members of limited liability companies or executive officers of any corporate entity; and provide for a "Waiver of Subrogation" endorsement in favor of the Owner/Contractor.

Any Contractor/Subcontractor with a principal place of business located outside of the State of New York must include New York under Part 3A of the policy.

B. <u>Commercial General Liability</u>:

Commercial general liability insurance as provided under the ISO Commercial General Liability Coverage Form, CG 00 01, or its equivalent, for claims of Bodily Injury, Property Damage and Personal and Advertising Injury, with limits of not less than:

Per Occurrence and Personal & Advertising Injury-
$1,000,000

.00 General Aggregate & Products/Completed Operations Aggregate-
$2,000,000

.00 Fire Damage Legal Liability/Damage to Rented Property-
$100,000.

00 Medical Payment (per-person) $5,000.00

The coverage must include the following:

1. Liability assumed by the insured in an "insured contract" as that term is defined in the ISO Commercial General Liability Coverage Form, CG 00 01.

2. Products/Completed Operations liability for a period of three years after acceptance of the work.

3. A per project aggregate of $ 2,000,000.00.

4. A "Waiver of Subrogation" Endorsement in favor of the Owner/Contractor.

5. Exterior Insulation Finish System ("EFIS") coverage must be specifically included or provided separately where the Contractor/Subcontractor work under this Agreement or in any contract or agreement to which this Addendum is attached in any way involves EFIS.

6. The coverage shall not include any provision, definition, exclusion or endorsement which in any way would serve to eliminate the insurance to any insured or additional insured for liability for bodily injury or property damage arising from work performed in New York State, for claims made under the New York Labor Law or for claims made by employees, subcontractors and employees of subcontractors hired to perform work by any insured or additional insured pursuant to work that is subject to this Addendum Agreement or in any contract or agreement to which this Addendum Agreement is attached.

7. The insurance is to be provided through insurers licensed and admitted to do

business in the State of New York, with an A. M. Best financial rating of A- or better, or otherwise specifically approved by the Owner.

The Authority, its officers, directors, partners, representatives, agents and employees must be named as Additional Insureds on a primary and non-contributory basis on both the ongoing and completed operations coverage required herein utilizing the ISO endorsements: CG 2010 04 13 or CG 2038 04 13 (or their equivalent) for ongoing operations; and CG 2037 04 13 (or its equivalent) for completed operations. The Additional Insured coverage shall contain no special limitation or limitation on the scope of the protection afforded to the Additional Insureds.

C. **Commercial Automobile Liability Insurance**:

Commercial Automobile Liability insurance covering the ownership, maintenance and use of all Owned, Non-Owned and Hired Vehicles by the Subcontractor with combined Bodily Injury and Property Damage limits including pollution transit coverage of $1,000,000.00 per accident. The Authority, its officers, directors, partners, representatives, agents and employees must be named as Additional Insureds on a primary and non- contributory basis. A "Waiver of Subrogation" in favor of the Authority must be included.

D. Commercial Umbrella/Excess Liability Insurance:

Commercial Umbrella/Excess Liability Insurance with limits of $5,000,000.00 per occurrence and a $5,000,000.00 aggregate. The Authority, its officers, directors, partners, representatives, agents and employees must be named as Additional Insureds on a primary and non-contributory basis. A "Waiver of Subrogation" in favor of the Authority must be included.

E. Pollution Liability:

Pollution liability coverage applicable to the type of work/operations being performed in the amount of $5,000,000.00 per occurrence and $5,000,000.00 aggregate limit. The Authority, its officers, directors, partners, representatives, agents and employees must be named as Additional Insureds on a primary and non-contributory basis. A "Waiver of Subrogation" in favor of the Authority must be included.

F. Builder's Risk/Installation Floater:

"All Risk" Property Insurance coverage afforded by a Builder's Risk/Installation Floater or its equivalent insuring all materials, equipment and supplies provided by the Subcontractor and intended to become a permanent part of the construction, whether stored on the premises, away from the project site and/or while in transit, in an amount equal to the replacement cost of such materials, equipment and supplies. A "Waiver of Subrogation" in favor of the Authority must be included.

G. Owned and/or Rented Tools or Equipment:

Property insurance covering all owned, rented, leased and/or borrowed tools or equipment of the Subcontractor or used by the Subcontractor in connection with the

work that is subject to this Agreement or to any contract or agreement to which this Addendum is attached, in an amount equal to the replacement cost of such tools or equipment. A “Waiver of Subrogation” in favor of the Authority must be included.

JOB-SITE SAFETY:

The Authority makes no representation with respect to the physical conditions or safety of the Project Site. The Subcontractor shall, at its own expense, protect from injury its employees engaged in the performance of the Work. The prevention of accidents to all workers engaged in the Subcontractor’s work and others affected by the Subcontractor’s work is the responsibility of the Subcontractor. Subcontractor shall comply with all applicable federal, state, labor and local laws, regulations and codes concerning safety.

For purposes of this Addendum Agreement, “Project Site” means the entire construction site or the various separately identifiable part of the site described in any contract or agreement to which the Addendum Agreement is attached, and as described in the Primary Contract with the Authority.

WORKERS COMP IMMUNITY WAIVER:

In any and all claims against the Authority by any employee of the Subcontractor, anyone directly or indirectly employed by the Subcontractor (including any of the Subcontractor’s subcontractors) or anyone for whose acts the Subcontractor may be liable, the indemnification obligation shall not be limited by any limitation on the amount or type of damages, compensation or benefits payable by or for the Subcontractor under workers’ compensation acts, disability benefit acts or other employee benefit acts.

HOLD HARMLESS / INDEMNIFICATION:

To the fullest extent permitted by law, Subcontractor shall defend, indemnify and hold harmless the Authority and its heirs, executors, administrators, successors, assigns, affiliates, employees and agents (hereinafter referenced as “Owner Indemnitees”) from and against any and all actions, claims, liabilities, damages, losses and expenses, including but not limited to bodily injury, death and property damage, and reasonable attorney's fees and costs (including those incurred in the defense of any such underlying claim, as well as those incurred in the enforcement of this Addendum Agreement and/or in the prosecution of any claim for indemnification by Authority) arising out of or resulting from, or alleged to arise out of or result from, the Subcontractor’s work (including the work by any of the Subcontractor’s subcontractors), except to the extent caused by the negligence or willful misconduct of any Owner Indemnitees.

MISCELLANEOUS:

If any term or provision of this Addendum Agreement conflicts with or is otherwise inconsistent with any term or provision in the Primary Contract or any prior written agreement entered between the parties, the terms and provisions contained herein shall govern and control.

This Addendum Agreement shall be binding upon and inure to the benefit of the parties hereto and their successors and permitted assigns. This Addendum Agreement, its terms and any

claims arising therefrom, shall be interpreted and construed in accordance with the laws of the State of New York.

This Addendum Agreement may be executed via facsimile or email in any number of counterparts, all of which taken together shall constitute one and the same agreement. No waiver by a party of any breach by the other party of any of the provisions of this Agreement shall be deemed a waiver of any preceding or succeeding breach of the same or any other provisions hereof. No such waiver shall be effective unless in writing and then only to the extent expressly set forth in writing.

No modification or amendment of this Addendum Agreement shall be effective unless in writing and signed by both parties and approved in writing by the Authority. If any term or provision of this Addendum Agreement shall to any extent be invalid or unenforceable, the remainder of this Addendum Agreement shall not be affected thereby, and each provision of this Addendum Agreement shall be valid and enforceable to the fullest extent permitted by law.

Certificates of Insurance should be e-mailed to mmusarra@ecwa.org or mailed to Molly Jo Musarra, Claim Representative/Risk Manager Erie County Water Authority, 295 Main Street – Room 350, Buffalo, New York 14203-2494, or If you have any questions you can contact Ms. Musarra by e-mail or phone (716) 849-8465.

[Insert name of Upstream Contractor or Upstream Subcontractor]	**[Insert name of Downstream Subcontractor]**
_____	_____
[Insert Name of Representative]	[Insert Name by Representative]
(Print name and title)	(Print name and title)
Date:	Date:

APPENDIX C

PREVAILING WAGE RATE SCHEDULE

ERIE COUNTY WATER AUTHORITY

INSTRUCTIONS AND SCHEDULE OF MINIMUM WAGE RATES ISSUED BY NEW YORK STATE LABOR DEPARTMENT

No laborer, worker or mechanic in the employ of the CONTRACTOR or a Subcontractor or other person doing or contracting to do a whole or a part of the work contemplated by this agreement, shall be permitted or required to work more than eight (8) hours in any calendar day, or more than five (5) days in any one week, except in cases of extraordinary emergency caused by fire, flood, or damages to life and property.

The wages to be paid for a legal day's work to laborers, workmen or mechanics under this agreement, shall not be less than the prevailing rate of wages as defined and determined by the Industrial Commissioner of the State of New York, a schedule of which is attached to this contract and made a part thereof, with the same force and effect as though set forth in full herein.

In the performance of the work the CONTRACTOR shall give preference to citizens of the State of New York who have been residents for at least twelve (12) months immediately prior to the commencement of their employment, and persons other than citizens may be employed when citizens of the State of New York are not available. If the above provisions of this contract and the provisions of Sec. 222 of the Law of the State of New York are not complied with, this contract Labor shall be void.

In the hiring of employees for the performance of work under this contract or by subcontract hereunder, the CONTRACTOR or subcontractor, or any persons acting on behalf of the CONTRACTOR or subcontractor, shall not by any reason of race or color discriminate against or intimidate any employee hired for the performance of work under this contract on account of race or color.

There may be deducted from the amount payable to the CONTRACTOR by the Water Authority, under this contract, a penalty of five dollars ($5.00) for each person for each calendar day during which such person was discriminated against or intimidated in violation of the provisions of this contract.

This contract may be cancelled or terminated by the Water Authority and all monies due or to become due hereunder may be forfeited for a second or subsequent violation of the terms or conditions of the preceding paragraph of this contract.

PUBLIC WORKS - FAILURE TO PAY PREVAILING WAGE

EXCLUSION FROM CONTRACTING OR SUBCONTRACTING

CHAPTER 147

A. 7314-A

Memorandum relating to this chapter, see Legislative Memoranda, post.

Approved may 24, 1991, effective as provided in Section 3.

An act to amend the labor law, in relation to debarment of public building service CONTRACTORS

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1:

Paragraph b of Subdivision 3 of Section 220-b of the Labor Law, as amended by Chapter 651 of the Laws of 1989, is amended to read as follows:

b. When two final determinations have been rendered against a CONTRACTOR or subcontractor and/or its successor within any consecutive six-year period determining that such CONTRACTOR or subcontractor and/or its successor has willfully failed to pay the prevailing rate of wages or to provide supplements in accordance with this article, whether such failures were concurrent or consecutive and whether or not such final determinations concerning separate public work projects are rendered simultaneously, such CONTRACTOR or subcontractor and/or its successor shall be ineligible to submit a bid on or be awarded any public work contract with the state, any municipal corporation or public body for a period of five years from the second final determination. For purposes of this article, a successor shall mean an employer engaged in work substantially similar to that of the predecessor, where there is substantial continuity of operation with that of the predecessor.

SECTION 2:

Subdivision 7 of Section 235 of the labor Law, as added by Chapter 777 of the Laws of 1971, is amended to read as follows:

7. When, pursuant to the provisions of this section two final orders have been entered against a CONTRACTOR or subcontractor and/or its successor within any consecutive six-year period determining that such CONTRACTOR or subcontractor and/or its successor has willfully failed to pay the prevailing wages in accordance with the provisions of this article, whether such failures were concurrent or consecutive and whether or not such final determinations concerning separate public building service contracts are rendered simultaneously, such CONTRACTOR or subcontractor and/or its successor, and if the CONTRACTOR or subcontractor and/or its successor is a corporation, any officer of such corporation who knowingly participated in such failure, shall be ineligible to submit a bid on or be awarded any public building service work for a period of five years from the date of the second order. For purposes of this article, a successor shall mean an employer engaged in work substantially similar to that of the predecessor, where there is substantial continuity of operation with that of the predecessor. Nothing of this subdivision shall be construed as affecting any provision of any other law or regulation relating to the awarding of public contracts.

SECTION 3:

This act shall take effect 60 days after the date upon which it shall have become a law and shall apply to any conduct occurring after such date.

STATE OF NEW YORK
DEPARTMENT OF LABOR

NOTICE TO ALL PUBLIC OFFICIALS IN CHARGE OF
PUBLIC WORK CONSTRUCTION AND ALL CONTRACTORS
AND SUBCONTRACTORS ENGAGED IN PUBLIC WORKS
CONSTRUCTION IN THE STATE OF NEW YORK

Article 8, Section 220 of the Labor Law, as amended by Chapter 750 of the Laws of 1956, provides, among other things, that it shall be the duty of the fiscal officer to make a determination of the schedule of wages to be paid to all laborers, workmen and mechanics employed on public work projects including supplements for welfare, pension, vacation and other benefits. These supplements may include hospital, surgical or medical insurance or benefits; life insurance or death benefits; accidental death or dismemberment insurance; and pension or retirement benefits. If the amount of supplements provided by the employer is less than the total supplements shown on the wage schedule, the difference shall be paid in cash to employees.

Article 8, Section 220 of the Labor Law, as amended by Chapter 750 of the Laws of 1956, also provides that the supplements to be provided to laborers, workmen and mechanics upon public works "shall be in accordance with the prevailing practices in the locality..." The amount for supplements listed on the enclosed schedule does not necessarily include all types of prevailing supplements in the locality, and a future determination of the Industrial Commissioner may require the CONTRACTOR to provide additional supplements.

The CONTRACTOR shall provide statutory benefits for disability benefits, workmen's compensation, unemployment insurance and Social Security.

The substance of this notice should be included in your contract.

Signed - Dr. Philip Ross
INDUSTRIAL COMMISSIONER

PW-39 (5-56)

Article 8 of the New York State Labor Law was amended on July 15, 1983 to provide that wages for Public Projects are to be paid pursuant to the existing Bargaining Agreement in the area where the work is to be performed.

Wages are to be paid on this project as hereinafter set forth or pursuant to the Collective Bargaining Agreement in effect in Erie County, whichever are higher.

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

(a) The CONTRACTOR will not discriminate against any employee or applicant for employment because of race, creed, sex, age, color or national origin, and will take affirmative action to insure that they are afforded equal employment opportunities without discrimination because of race, creed, sex, age, color or national origin or because a person has opposed any practices forbidden under these sections or because he filed a complaint, testified, or assisted in any proceeding under these sections. Such action shall be taken with reference, but not limited to: recruitment, employment, classification, job assignment, promotion, upgrading, demotion, transfer, layoff, discharge, expulsion or termination, rates of pay or other forms of compensation, and selection for training or retraining, including apprenticeship and on-the-job training.

(b) The CONTRACTOR will send to each labor union or representative of workers with which he has or is bound by a collective bargaining or other agreement or understanding, a notice, to be provided by the State Commission for Human Rights, advising such labor union or representative of the CONTRACTOR'S agreement under clauses (a) through (h) (hereinafter called "non-discrimination clauses") and requesting such labor union or representative to agree in writing, whether in such collective bargaining or other agreement or understanding or otherwise, that such labor union or representative will not discriminate against any member or applicant for membership because of race, creed, sex, age, color or national origin, and will take affirmative action to insure that they are afforded equal membership opportunities without discrimination because of race, creed, sex, age, color or national origin. Such action shall be taken with reference, but not limited to: recruitment, employment, job assignment, promotion, upgrading, classification, demotion, transfer, layoff, discharge, expulsion or termination, rates of pay or other forms of compensation, and selection for training or retraining, including apprenticeship and on-the-job training. Such notice shall be given by the CONTRACTOR prior to the commencement of performance of this contract. Such written agreement shall be made by such labor union or representative prior to the commencement of performance of this contract, unless such labor union or representative fails or refuses so to agree in writing, in which event the CONTRACTOR shall promptly notify the State Commission for Human Rights of such failure or refusal.

(c) The CONTRACTOR will post and keep posted in conspicuous places, available to employee's and applicants for employment, notices to be provided by the State Commission for Human Rights setting forth the substance of the provisions of clauses (a) and (b) and such provisions of the State's laws against discrimination as the State Commission for Human Rights shall determine.

(d) The CONTRACTOR will state, in all solicitations or advertisements for employees placed by or on behalf of the CONTRACTOR, that all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, sex, age, color or national origin.

(e) The CONTRACTOR will comply with the provisions of Sections 291-299 of the Executive Law and the Civil Rights Law, will furnish all information and reports deemed necessary by the State Commission for Human Rights under these non-discrimination clauses and such sections of the Executive Law, and will permit access to his books, records and accounts by the State Commission for Human Rights, the Attorney General and the Industrial Commissioner for purposes of investigation to ascertain compliance with these non-discrimination clauses and such sections of the Executive Law and Civil Rights Law.

(f) This contract may be forthwith cancelled, terminated or suspended, in whole or in part, by the contracting agency upon the basis of a finding made by the State Commission for Human Rights that the CONTRACTOR has not complied with these non-discrimination clauses, and the CONTRACTOR may be declared ineligible for future contracts made by or on behalf of the State or a public authority or agency of the State, until he satisfied the State Commission for Human Rights that he has established and is carrying out a program in conformity with the provisions of these non-discrimination clauses. Such finding shall be made by the State Commission for Human Rights after conciliation efforts by the Commission have failed to achieve compliance with these non-discrimination clauses and after a verified complaint has been filed with the Commission, notice thereof has been given to the CONTRACTOR and an opportunity has been afforded him to be heard publicly before three members of the Commission. Such sanctions may be imposed and remedies invoked independently of or in addition to sanctions and remedies otherwise provided by law.

(g) If this contract is cancelled or terminated under clause (f), in addition to other rights of the Erie County Water Authority provided in this contract upon its breach by the CONTRACTOR, the CONTRACTOR will hold the Erie County Water Authority harmless against any additional expenses or costs incurred by the Authority in completing the work or in purchasing the services, materials, equipment or supplies contemplated by this contract, and the Erie County Water Authority may withhold payments from the CONTRACTOR in an amount sufficient for this purpose and recourse may be had against the surety on the performance bond if necessary.

(h) The CONTRACTOR will include the provisions of clauses (a) through (g) in every subcontract or purchase order in such manner that provisions will be binding upon each subcontractor or vendor as to operations to be performed within the State of New York. The CONTRACTOR will take such action in enforcing such provisions of such subcontract or purchase order as the contracting agency may direct, including sanctions or remedies for noncompliance. If the CONTRACTOR becomes involved in or is threatened with litigation with a subcontractor or vendor as a result of such direction by the contracting agency, the CONTRACTOR shall promptly so notify the Attorney General and Attorney for the Erie County Water Authority, requesting them to intervene and protect the interest of the State of New York and the Erie County Water Authority.

Erie County Water Authority

Mark DiPasquale
Nussbaumer & Clarke, Inc.
3556 Lake Shore Road
Suite 500
Buffalo NY 14219

Schedule Year	2021 through 2022
Date Requested	01/14/2022
PRC#	2022000465

Location	Newstead Water Storage Tank
Project ID#	20J1-0154
Project Type	Contract No. NC-043, Project No. 202100048, Water System Improvements Newstead Water Storage Tank

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, contemperaneous, 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 journeyworkers in any craft classification can be no greater than the statewide building trade ratios promulgated by the Department of Labor and included with the Prevailing Rate Schedule. An employee listed on a payroll as an apprentice who is not registered as above or is performing work outside the classification of work for which the apprentice is indentured, must be paid the prevailing journeyworker's wage rate for the classification of work the employee is actually performing.

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

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

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

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

Interest and Penalties

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

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

Debarment

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

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

Criminal Sanctions

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

Discrimination

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

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

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

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

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

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

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

Workers' Compensation

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

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

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

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

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

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

Unemployment Insurance

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

Kathy Hochul, Governor

Roberta Reardon, Commissioner

Erie County Water Authority

Mark DiPasquale
Nussbaumer & Clarke, Inc.
3556 Lake Shore Road
Suite 500
Buffalo NY 14219

Schedule Year 2021 through 2022
Date Requested 01/14/2022
PRC# 2022000465

Location Newstead Water Storage Tank
Project ID# 20J1-0154
Project Type Contract No. NC-043, Project No. 202100048, Water System Improvements Newstead Water Storage Tank

Notice of Contract Award

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

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

Contractor Information
All information must be supplied

Federal Employer Identification Number: _____

Name: _____

Address: _____

_____

City: _____ State: _____ Zip: _____

Amount of Contract: $_____

Approximate Starting Date: ____/____/____

Approximate Completion Date: ____/____/____

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

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

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

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1. Purpose and Scope:

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

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

2. Background and Statutory References:

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

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

3. Procedures and Agency Responsibilities:

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

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

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

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

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

Reports should contain the following information:

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

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

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

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

NEW YORK STATE OF OPPORTUNITY. Department of Labor

Required Notice under Article 25-B of the Labor Law

Attention All Employees, Contractors and Subcontractors: You are Covered by the Construction Industry Fair Play Act

The law says that you are an employee unless:

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

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

It is against the law for an employer to misclassify employees as independent contractors or pay employees off the books.

Employee Rights: If you are an employee, you are entitled to state and federal worker protections. 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)

New York State Department of Labor
Bureau of Public Work

Attention Employees

THIS IS A:

PUBLIC WORK PROJECT

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

Chapter 629 of the Labor Laws of 2007:

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

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

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

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

Contractor Name: _____

Project Location: _____

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 of other documentation from the certified trainer pending the issuance of the card.
- Other valid proof

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

Any questions regarding this statute may be directed to the New York State Department of Labor, Bureau of Public Work at 518-457-5589.

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 requirement s 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 that 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

Erie County General Construction

Boilermaker — 01/01/2022

JOB DESCRIPTION Boilermaker **DISTRICT** 12

ENTIRE COUNTIES
Allegany, Cattaraugus, Chautauqua, Chemung, Erie, Genesee, Livingston, Monroe, Niagara, Ontario, Orleans, Schuyler, Steuben, Wayne, Wyoming, Yates

WAGES
Per hours: 07/01/2021

Boilermaker	$ 35.10

The wage rate will be 90% of the above for Maintenance work on boilers less than 100,000 pph.

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: $ 31.04*

*NOTE: $29.85 of this amount is for every Hour "Paid"

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

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

REGISTERED APPRENTICES
1st Term at 12 Months
Terms 3-8 at 6 Months
Per Hour:
1st 65%
3rd 70% 4th 75% 5th 80% 6th 85% 7th 90% 8th 95%

Supplemental Benefits per hour:

All Terms	$ 31.04**

**NOTE: $29.85 of this amount is for every Hour "Paid"

12-7

Carpenter - Building — 01/01/2022

JOB DESCRIPTION Carpenter - Building **DISTRICT** 12

ENTIRE COUNTIES
Erie

PARTIAL COUNTIES
Cattaraugus: Townships of Persia and Perrysburg

WAGES
Per hour: 07/01/2021
Building:

Carpenter	$ 33.05
FloorLayer	33.05
Certified Welder	34.05
Hazardous Waste Worker	34.55
Diver-Dry Day	34.05
Diver Tender	34.05
Diver-Wet Day***	61.25

Hazardous Waste Worker: Hazardous sites requiring personal protective equipment.

*** Diver rate applies to all hours worked on the day of dive.

Depth pay for divers:	0' to 80'	no additional fee
	81' to 100'	additional $0.50 per foot
	101' to 150'	additional $0.75 per foot
	151' and deeper	additional $1.25 per foot
Penetration pay:	0' to 50'	no additional fee
	51' to 100'	additional $0.75 per foot
	101' and deeper	additional $1.00 per foot

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 worked:

Carpenter(s)	$ 28.73
Diver(s)	28.73

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

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

REGISTERED APPRENTICES
Wages per hour:

One year terms at the following percentage of Journeyman's base wage:

Floorlayer Apprentices:

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

Carpenter Apprentices:

1st	2nd	3rd	4th	5th
55%	60%	65%	70%	80%

Supplemental Benefits per hour worked:

1st	2nd	3rd	4th	5th
$12.40	$12.40	$15.05	$15.05	$15.05

12-276B-Cat

Carpenter - Building / Heavy&Highway — 01/01/2022

JOB DESCRIPTION Carpenter - Building / Heavy&Highway **DISTRICT** 2

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

PARTIAL COUNTIES
Orange: The area lying on Northern side of Orange County demarcated by a line drawn from the Bear Mountain Bridge continuing west to the Bear Mountain Circle, continue North on 9W to the town of Cornwall where County Road 107 (also known as Quaker Rd) crosses under 9W, then east on County Road 107 to Route 32, then north on Route 32 to Orrs Mills Rd, then west on Orrs Mills Rd to Route 94, continue west and south on Route 94 to the Town of Chester, to the intersection of Kings Highway, continue south on Kings Highway to Bellvale Rd, west on Bellvale Rd to Bellvale Lakes Rd, then south on Bellvale Lakes Rd to Kain Rd, southeast on Kain Rd to Route 17A, then north and southeast along Route 17A to Route 210, then follow Route 210 to NJ Border.

WAGES

Wages per hour:	07/01/2021
Carpenter - ONLY for Artificial Turf/Synthetic Sport Surface	$ 32.08

Note - Does not include the operation of equipment. Please see Operating Engineers rates.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman	$ 24.20

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

HOLIDAY
Paid: See (5) on HOLIDAY PAGE
Overtime: See (5, 6, 16) on HOLIDAY PAGE
Notes:
When a holiday falls upon a Saturday, it shall be observed on the preceding Friday. Whan a holiday falls upon a Sunday, it shall be observed on the following Monday.
An employee taking an unexcused day off the regularly scheduled day before or after a paid Holiday shall not receive Holiday pay.

REGISTERED APPRENTICES
Wages per hour:

One year terms at the following percentage of Journeyman's wage:

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

Supplemental Benefits per hour:

1st year term	$ 12.15
2nd year term	12.15
3rd year term	14.80
4th year term	14.80

2-42AtSS

Carpenter - Heavy&Highway — 01/01/2022

JOB DESCRIPTION Carpenter - Heavy&Highway **DISTRICT** 12

ENTIRE COUNTIES
Erie

WAGES
Per hour: 07/01/2021

Carpenter	$ 36.39
Certified Welder	37.89
Diver-Dry Day	37.39
Diver-Wet Day**	61.39
Diver Tender	37.39
Hazardous Material Worker	38.39
Piledriver	36.39
Effluent & Slurry Diver-Dry Day	56.08
Effluent & Slurry Diver-Wet Day	92.08

Hazardous Waste Worker: Hazardous sites requiring personal protective equipment.

** Diver rate applies to all hours worked on the day of dive.

Depth pay for divers:	0' to 50'	no additional fee
	51'to 100'	additional $0.50 per foot
	101' to 150'	additional $0.75 per foot
	151' to 200'	additional $1.25 per foot
Penetration pay:	0' to 50'	no additional fee
	51' to 100'	additional $0.75 per foot
	101' to deeper	additional $1.00 per foot

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 worked:

Carpenter(s)	$ 29.89
Diver(s)	29.89

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

HOLIDAY
Paid: See (2, 17) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages per hour:

One year terms at the following percentage of Journeyman's wage:

Carpenter Apprentice:

1st	2nd	3rd	4th	5th
55%	60%	65%	70%	80%

Pile Driver Apprentice(1300hour terms at percentage of Pile Driver Rate)

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

Supplemental benefits per hour worked:

1st	2nd	3rd	4th	5th
$12.15	$12.15	$14.80	$14.80	$14.80

12-276HH-Erie

Electrician — 01/01/2022

JOB DESCRIPTION Electrician **DISTRICT** 3

ENTIRE COUNTIES
Erie

PARTIAL COUNTIES
Cattaraugus: Only the Townships of Ashford, East Otto, Ellicottville, Farmersville, Freedom, Franklinville, Lyndon, Machias, Mansfield, New Albion, Otto, Perrysburg, Persia and Yorkshire.
Genesee: Only the Townships of Alabama, Alexander, Darien, Oakfield,Pembroke and that portion of the Towns of Batavia and Elba that are west of Little Tonawanda Creek; Tonawanda Creek; the City limits of Batavia (in effect prior to Feb. 1, 1970) and State Highway 98 north of the City of Batavia, then north on Highway 98 to the Orleans County line.
Wyoming: Only the Townships of Arcade, Attica, Bennington, Eagle, Java, Orangeville, Sheldon and Wethersfield.

WAGES

Per hour:	07/01/2021	05/30/2022 Additional
Electrician*	$ 37.49	$ 2.00

* Includes teledata work

When shift work is mandated either in the job specification or by the contracting agency the following premiums apply:
17.3% for work from 4:30PM - 1:00AM
31.4% for work from 12:30AM - 9:00AM
Additional $0.50/hr in shafts over 25 ft. deep and in underground tunnels over 75 ft. long.
Additional $0.75/hr for work on toothpicks, structural steel, temporary platforms, swinging scaffolds, boatswain chairs, smoke stacks or water towers 30 ft above the floor or for work on rolling scaffolds and ladders over 50 ft.
Additional $1.50/hr for Cable Splicers on such work as lead, and shielded cable and splices or terminations on cable 5KV and above.
Additional $1.00/hr for Hot work (Atomic plants).
Additional $2.00/hr for work on radio, TV, light towers and floating platforms or climbing ladders in excess of 100 ft. high.

SUPPLEMENTAL BENEFITS
Per hour:
$ 30.05*
* NOTE - add 3% of the posted straight time or applicable premium wage rate.

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

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

REGISTERED APPRENTICES
Wages per hour:

Hour terms at the following wages:

0 to 1000	to 2000	to 3500	to 5000	to 6500	to 8000
$ 13.85	$ 15.00	$ 16.85	$ 20.60	$ 26.25	$ 30.00

Supplemental benefits per hour:

0 to 2000	to 6500	to 8200
$ 13.51*	$ 24.30*	$ 30.05*

* NOTE - add 3% of the posted straight time or applicable premium wage rate.

3-41

Elevator Constructor — 01/01/2022

JOB DESCRIPTION Elevator Constructor **DISTRICT** 3

ENTIRE COUNTIES
Allegany, Cattaraugus, Chautauqua, Erie, Genesee, Niagara, Orleans, Wyoming

WAGES

Per hour:	07/01/2021
Elevator Constructor	$ 53.16
Helper	37.21

** IMPORTANT NOTICE - EFFECTIVE 04/01/2009 **
Four (4), ten (10) hour days may be worked at straight time during a week, Monday thru Thursday or Tuesday 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 may be liable for overtime payments for work over 8 hours per day.

SUPPLEMENTAL BENEFITS
Per hour:

$ 35.83

Note - add 6% of regular hourly rate for all hours worked.

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

REGISTERED APPRENTICES
Wages per hour:

One year (1,700 hour each) terms at the following percentage of Journeyman's wage:

1st*	2nd	3rd	4th
55%	65%	70%	80%

Supplemental benefits per hour:

$ 35.83

* Note - 0-6 months of the 1st year term is paid at 50% of Journeyman's wage with no Supplemental benefits.

Note - add 6% of regular hourly rate for all hours worked.

3-14

Glazier — 01/01/2022

JOB DESCRIPTION Glazier **DISTRICT** 3

ENTIRE COUNTIES
Allegany, Cattaraugus, Chautauqua, Erie, Genesee, Niagara, Orleans, Wyoming

WAGES

Per hour:	07/01/2021
Glazier	$ 27.88
Working off Suspended Scaffold (Swing Stage)	28.88
Maintenance	17.50*

* Note - This rate to be used only for all repair and replacement work such as glass breakage, glass replacement, door repair and board ups.

** IMPORTANT NOTICE **
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:

Journeymen Glazier	$ 24.19
Maintenance	15.49

OVERTIME PAY
See (B, E2, F, R) on OVERTIME PAGE

HOLIDAY

Paid:	See (1) on HOLIDAY PAGE for Glazier and Glazier Apprentices.
Paid:	See (5, 6) on HOLIDAY PAGE for Maintenance
Overtime:	See (5, 6) on HOLIDAY PAGE.

REGISTERED APPRENTICES
Wages per hour:

Glazier: 1000 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%	90%

Supplemental benefits per hour:

1st & 2nd terms	$ 8.00
3rd & 4th terms	8.85
All other terms	10.25

3-660

Insulator - Heat & Frost — 01/01/2022

JOB DESCRIPTION Insulator - Heat & Frost **DISTRICT** 3

ENTIRE COUNTIES
Allegany, Cattaraugus, Chautauqua, Erie, Niagara, Wyoming

PARTIAL COUNTIES
Genesee: Only the Townships of Alabama, Alexander, Darien, Oakfield and Pembroke.

WAGES

Per Hour:	07/01/2021
Heat & Frost Insulator	$ 34.15

SUPPLEMENTAL BENEFITS
Per hour:
$ 26.14

OVERTIME PAY
See (B, *E, **Q) on OVERTIME PAGE
* Note - Double time after 10 hours on Saturday.
** Note - Triple time on Labor Day if WORKED.

HOLIDAY

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

REGISTERED APPRENTICES
Wages per hour:

One year terms at the following percentage of Journeyman's wage:

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

Supplemental Benefits per hour:

1st and 2nd	$ 21.09
All other terms	$ 26.14

3-4

Ironworker **01/01/2022**

JOB DESCRIPTION Ironworker **DISTRICT** 3

ENTIRE COUNTIES
Cattaraugus, Chautauqua

PARTIAL COUNTIES
Allegany: Entire county except the Towns of Birdsall, Burns and Grove.
Erie: All except the Town of Grand Island north of Whitehaven Road.
Genesee: Only the Townships of Alabama, Alexander, Darien and Pembroke
Steuben: Only the Townships of Canisteo, Freemont, Greenwood,Hartsville, Hornell, Hornellsville, Howard, Jasper, Troupsburg and West Union
Wyoming: Only the Townships of Arcade, Attica, Bennington, Eagle,Gainsville, Java, Orangeville, Pike, Sheldon, Warsaw and Wethersfield.

WAGES

Per hour:	07/01/2021
Structural	$ 31.90
Ornamental	31.90
Layout	31.90
Rodmen	31.90
Reinforcing	31.90
Welders	31.90
Riggers & Mach. Movers	31.90
Curtain Wall Erector	31.90
Window Erector	29.55
Fence Erector	30.47

When shift work is mandated either in the job specification or by the contracting agency the following premiums apply:
10% for second shift work from 2:00PM - 7:00PM
15% for third shift work from 7:00PM - 12:00AM

When a single irregular shift is worked outside the standard workday with the start times based on second and third shifts, a 10% premium on hours worked applies.

SUPPLEMENTAL BENEFITS

Per hour:	
Fence erectors	$ 29.13
All others	30.63

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

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

REGISTERED APPRENTICES
Wages per hour:

One year terms at the following wage:

1st	2nd	3rd	4th
$ 19.50	$ 21.50	$ 23.50	$ 25.50

Supplemental benefits per hour:

1st	2nd	3rd	4th
$ 13.38	$ 23.18	$ 24.58	$ 25.98

3-6

Ironworker **01/01/2022**

JOB DESCRIPTION Ironworker **DISTRICT** 3

ENTIRE COUNTIES
Niagara

PARTIAL COUNTIES
Erie: Only that portion of the Township of Grand Island north of Whitehaven Road.
Orleans: Only the Townships of Ridgeway, Shelby and Yates.

WAGES
Per hour: 07/01/2021

Structural	$ 31.00
Ornamental	31.00
Reinforcing	31.00
Rigger & Mach. Mover	31.00
Pre-Engineered	31.00
Fence Erector	31.00
Pre-Cast Erector	31.00
Welder	31.00
Window Erector	31.00

When shift work is mandated either in the job specification or by the contracting agency the following premiums apply:
10% for second shift work from 2:00PM - 7:00PM
15% for third shift work from 7:00PM - 12:00AM

When a single irregular shift is worked outside the standard workday with the start times based on second and third shifts, a 10% premium on hours worked applies.

SUPPLEMENTAL BENEFITS
Per hour:

$ 31.78

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

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

REGISTERED APPRENTICES
Wages per hour:

One year terms at the following wage:

1st term	$ 19.50
2nd term	21.50
3rd term	23.50
4th term	25.50

Supplemental benefits per hour:

1st term	$ 12.28
2nd term	19.98
3rd term	21.08
4th term	22.18

3-9

Laborer - Building — 01/01/2022

JOB DESCRIPTION Laborer - Building **DISTRICT** 3

ENTIRE COUNTIES
Erie

PARTIAL COUNTIES
Cattaraugus: Only the Townships of Perrysburg and the Village Gowanda.

WAGES
CLASS A: Basic, Safety Man, Flagman, Tool Room Man, Nurseryman, Demolition Worker, Top Man, Wrecker, IBC Barriers Except on Structures, Guard Rail, Asphalt Shovelers, Foundation Laborer over 8' in Depth, Hod Carriers, Plaster Tender, Plaster Scaffold Builder, Pneumatic Gas, Electric Tool Operator including all forms of Busters, Jackhammers and Chipping Guns, Steel Burners.

CLASS B: Mortar Mixer, Asphalt Smoothers, Pneumatic Gas, Electric Tool Operator including all forms of Busters, Jackhammers and Chipping Guns over 8' in depth.

CLASS C: Worker on any Swing Scaffold, Blaster, Plumbing Laborer, Wagon Drill Operator, Bottomman (caisson or cofferdam), Laser Setter, Asphalt Rakers, Asphalt Screed Man.

CLASS D: Stone Cutter, Curb Setter and Flag Layer.

CLASS E: Wearing of replaceable cartridge respirator.

CLASS F: Asbestos Removal, Deleader.

CLASS G: Hazardous Waste Worker.

Per hour:	07/01/2021	07/01/2022
Building Laborer:		Additional
CLASS A	$ 29.13	$ .60
CLASS B	29.30	.60
CLASS C	29.41	.60
CLASS D	29.88	.60
CLASS E	30.13	.60
CLASS F	30.63	.60
CLASS G	31.13	.60

SUPPLEMENTAL BENEFITS
Per hour:
$ 27.65

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

HOLIDAY
Paid: See (22) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE

REGISTERED APPRENTICES
Wages per hour:

Hour terms at the following percentage of Journeyman's wage:

0 to 500	to 1000	to 1500	to 2000	to 2500	to 3000	to 4000
55%	60%	65%	70%	75%	80%	90%

Supplemental benefits per hour:

$ 27.65

3-210b

Laborer - Heavy&Highway **01/01/2022**

JOB DESCRIPTION Laborer - Heavy&Highway **DISTRICT** 3

ENTIRE COUNTIES
Erie

WAGES
Heavy/Highway Laborer:
GROUP A: Basic, Drill Helper, Flagman, Outboard and Hand Boats, Demolition Worker, Nurseryman, IBC Barriers (except on structures), Guard Rails, Road Markers.

GROUP B: Grade Checker, Chain Saw, Concrete Aggregate Bin, Concrete Bootmen, Gin Buggy, Hand or Machine Vibrator, Jack Hammer, Mason Tender, Mortar Mixer, Pavement Breaker, Handlers of Steel Mesh, Small Generators for Laborers' Tools, Pipe Layers, Vibrator Type Rollers, Tamper, Drill Doctor, Tail or Screw Operator on Asphalt Paver, Water Pump Operators (2" and Single Diaphragm), Nozzle (Asphalt, Gunite, Seeding, and Sand Blasting), Laborers on Chain Link Fence Erection, Rock Splitter and Power Unit, Pusher Type Concrete Saw and all other Gas, Electric, Oil and Air Tool Operators, Wrecking Laborer and Laser Man.

GROUP C: All Rock or Drilling Machine Operators (Except Quarry Master and Similar Type), Acetylene Torch Operators, Asphalt Raker, Powderman and Welder.

GROUP D: Blasters, Curb and Flatwork Formsetter not on structures, Stone or Granite Curb Setters and Stone Cutter.

Per hour:	07/01/2021
Heavy/Highway Laborer:	
GROUP A	$ 31.41
GROUP B	31.61
GROUP C	31.81
GROUP D	32.01

For all Deleader & Asbestos work add $1.50 to Group A rate.
For all Hazardous waste work add $2.00 to Group A rate.
For use of replaceable cartridge respirator add $1.00 to Group A rate.
An additional $3.00 per hour is required when a single irregular work shift starting any time from 5:00PM to 1:00AM is mandated either in the job specification or by the contracting agency.

Sewer/Water Laborer:

GROUP A: Basic, Flagman, Top man, Wreckers.

GROUP B: Foundation, Plaster tender, Scaffold bootman, Pneumatic, gas, electric, tool operator, jackhammer, chipping guns.

GROUP C: Mortar Mixer, over 8 ft. in depth.

GROUP D: Pavement formsetter, Steelburner, Caisson, Wagon Drill Oper., PipeLayer, Swing Scaffold.

GROUP E: Utility pave driver, Laser operator.

GROUP F: Blaster.

Per hour:	07/01/2021
Sewer/Water Laborer:	
GROUP A	$ 31.41
GROUP B	31.51
GROUP C	31.56
GROUP D	31.66
GROUP E	32.01
GROUP F	32.41

For all Deleader & Asbestos work add $1.50 to Group A rate.
For all Hazardous waste work add $2.00 to Group A rate.
An additional $3.00 per hour is required when a single irregular work shift starting any time from 5:00PM to 1:00AM is mandated either in the job specification or by the contracting agency.

SUPPLEMENTAL BENEFITS
Per hour:
$ 27.65

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

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

REGISTERED APPRENTICES
Wages per hour:

Hour terms at the following percentage of Journeyman's wage:

0 to 500	to 1000	to 1500	to 2000	to 2500	to 3000	to 4000
55%	60%	65%	70%	75%	80%	90%

Supplemental benefits per hour:

$ 27.65

3-210h

Laborer - Tunnel — 01/01/2022

JOB DESCRIPTION Laborer - Tunnel **DISTRICT** 3

ENTIRE COUNTIES
Erie

WAGES
CLASS A: Mole Nipper, Powder Handler, Changehouse Attendant and Top Laborer.

CLASS B: Air Spade, Jackhammer, Pavement Breaker.

CLASS C: Top Bell.

CLASS D: Bottom Bell, Side or Roofbelt Driller, Maintenance men, Burners, Block Layers, Rodmen, Caulkers, Miners helper, Trackmen, Nippers, Derailmen, Electrical Cablemen, Hosemen, Groutmen, Gravelmen, Form Workers, Movers and Shaftmen, Conveyor men.

CLASS E: Powder Monkey.

CLASS F: Blasters, Ironmen and Cement Worker, Miner, Welder, Heading Driller.

CLASS G: Steel Erectors, Piledriver, Rigger.

Per hour:	07/01/2021
Tunnel Laborer:	
CLASS A	$ 32.91
CLASS B	33.06
CLASS C	33.16
CLASS D	33.66
CLASS E	33.76
CLASS F	34.16
CLASS G	34.41

For all Deleader & Asbestos work add $1.50 to Class A rate.
For all Hazardous waste add $2.00 to Class A rate.
For use of replaceable cartridge respirator add $1.00 to Group A rate.
An additional $3.00 per hour is required when a single irregular work shift starting any time from 5:00PM to 1:00AM is mandated either in the job specification or by the contracting agency.

SUPPLEMENTAL BENEFITS
Per hour:
$ 27.65

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

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

REGISTERED APPRENTICES
Wages per hour:

Hour terms at the following percentage of Journeyman's wage:

0 to 500	to 1000	to 1500	to 2000	to 2500	to 3000	to 4000
55%	60%	65%	70%	75%	80%	90%

Supplemental benefits per hour:

$ 27.65

3-210t

Lineman Electrician — 01/01/2022

JOB DESCRIPTION Lineman Electrician **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, Wyoming, Yates

WAGES
Per hour:

NOTE: Includes Teledata Work within ten (10) feet of High Voltage Transmission Lines

Below rates applicable on all overhead and underground distribution and maintenance work, and all overhead and underground transmission line work and the installation of fiber optic cable where no other construction trades are or have been involved. (Ref #14.01.01)

	07/01/2021	05/02/2022	05/01/2023	05/06/2024
Lineman, Technician	$ 54.70	$ 56.00	$ 57.40	$ 58.90
Crane, Crawler Backhoe	54.70	56.00	57.40	58.90
Welder, Cable Splicer	54.70	56.00	57.40	58.90
Digging Mach. Operator	49.23	50.40	51.66	53.01
Tractor Trailer Driver	46.50	47.60	48.79	50.07
Groundman, Truck Driver	43.76	44.80	45.92	47.12
Equipment Mechanic	43.76	44.80	45.92	47.12
Flagman	32.82	33.60	34.44	35.34

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

Below rates applicable on all electrical sub-stations, switching structures, fiber optic cable and all other work not defined as "Utility outside electrical work". (Ref #14.02.01-A)

Lineman, Technician	$ 54.70	$ 56.00	$ 57.40	$ 58.90
Crane, Crawler Backhoe	54.70	56.00	57.40	58.90
Cable Splicer	60.17	61.60	63.14	64.79
Certified Welder -				
Pipe Type Cable	57.44	58.80	60.27	61.85
Digging Mach. Operator	49.23	50.40	51.66	53.01
Tractor Trailer Driver	46.50	47.60	48.79	50.07
Groundman, Truck Driver	43.76	44.80	45.92	47.12
Equipment Mechanic	43.76	44.80	45.92	47.12
Flagman	32.82	33.60	34.44	35.34

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

Below rates apply on switching structures, maintenance projects, railroad catenary install/maintenance third rail installation, bonding of rails and pipe type cable and installation of fiber optic cable. (Ref #14.02.01-B)

Lineman, Tech, Welder	$ 56.02	$ 57.32	$ 58.72	$ 60.22
Crane, Crawler Backhoe	56.02	57.32	58.72	60.22
Cable Splicer	61.62	63.05	64.59	66.24
Certified Welder -				
Pipe Type Cable	58.82	60.19	61.66	63.23
Digging Mach. Operator	50.42	51.59	52.85	54.20
Tractor Trailer Driver	47.62	48.72	49.91	51.19
Groundman, Truck Driver	44.82	45.86	46.98	48.18
Equipment Mechanic	44.82	45.86	46.98	48.18
Flagman	33.61	34.39	35.23	36.13

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

Below rates applicable on all overhead and underground transmission line work & fiber optic cable where other construction trades are or have been involved. This applies to transmission line work only, not other construction. (Ref #14.03.01)

Lineman, Tech, Welder	$ 57.21	$ 58.51	$ 59.91	$ 61.41
Crane, Crawler Backhoe	57.21	58.51	59.91	61.41
Cable Splicer	57.21	58.51	59.91	61.41
Digging Mach. Operator	51.49	52.66	53.92	55.27
Tractor Trailer Driver	48.63	49.73	50.92	52.20
Groundman, Truck Driver	45.77	46.81	47.93	49.13
Equipment Mechanic	45.77	46.81	47.93	49.13
Flagman	34.33	35.11	35.95	36.85

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 all 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.

6-1249a

Lineman Electrician - Teledata — 01/01/2022

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 — 01/01/2022

JOB DESCRIPTION Lineman Electrician - Traffic Signal, Lighting **DISTRICT** 6

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

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/groundman truck driver may assist in installing conduit, pipe, cables and equipment.

A flagger's duties shall consist of traffic control only.
(Ref #14.01.01)

Per hour:	07/01/2021	05/02/2022	05/01/2023	05/06/2024
Lineman, Technician	$ 47.15	$ 48.19	$ 49.32	$ 50.54
Crane, Crawler Backhoe	47.15	48.19	49.32	50.54
Certified Welder	49.51	50.60	51.79	53.07
Digging Machine	42.44	43.37	44.39	45.49
Tractor Trailer Driver	40.08	40.96	41.92	42.96
Groundman, Truck Driver	37.72	38.55	39.46	40.43
Equipment Mechanic	37.72	38.55	39.46	40.43
Flagman	28.29	28.91	29.59	30.32

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 all 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.

6-1249a-LT

Lineman Electrician - Tree Trimmer — 01/01/2022

JOB DESCRIPTION Lineman Electrician - Tree Trimmer **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, Wyoming, Yates

WAGES
Applies to line clearance, tree work and right-of-way preparation on all new or existing energized overhead or underground electrical, telephone and CATV lines. This also would include stump removal near underground energized electrical lines, including telephone and CATV lines.

Per hour:	07/01/2021	01/02/2022	12/31/2023
Tree Trimmer	$ 27.36	$ 28.25	$ 29.80
Equipment Operator	24.19	24.98	26.35
Equipment Mechanic	24.19	24.98	26.35
Truck Driver	20.15	20.80	21.94
Groundman	16.59	17.13	18.07
Flag person	12.50*	12.50*	13.03*

*NOTE: Subject to change due to any minimum wage increases. Rate effective 12/31/2021: $13.20

SUPPLEMENTAL BENEFITS
Per hour worked (but also required on non-worked holidays):

Journeyman	$ 9.98 *plus 3% of hourly wage	$ 10.23 *plus 3% of hourly wage	$ 10.48 *plus 3% of hourly wage

* 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 (5, 6, 8, 15) on HOLIDAY PAGE
Overtime: See (5, 6, 8, 15, 16, 25) on HOLIDAY PAGE
NOTE: All paid holidays falling on a Saturday shall be observed on the preceding Friday.
All paid holidays falling on a Sunday shall be observed on the following Monday.

6-1249TT

Mason - Building — 01/01/2022

JOB DESCRIPTION Mason - Building **DISTRICT** 3

ENTIRE COUNTIES
Erie, Niagara

PARTIAL COUNTIES
Cattaraugus: Only the Township of Perrysburg and the Village of Gowanda.

WAGES
Per hour: 07/01/2021
Plasterer $ 30.15

Additional $3.00/hr for work on swing stage over 20 feet.

SUPPLEMENTAL BENEFITS
Per hour:
$ 22.49

OVERTIME PAY
Exterior work only See (B, E, E2, Q) on OVERTIME PAGE.
All other work See (B, E, Q) on OVERTIME PAGE.

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

REGISTERED APPRENTICES
Wages per hour:

Hour terms at the following dollar amounts:

	07/01/2021	12/31/2021
0-1000	$ 12.50	$ 13.20
1000-2000	$ 14.00	$ 14.00
2000-3000	$ 15.00	$ 15.00
3000-4000	$ 16.00	$ 16.00
4000-4700	$ 17.00	$ 17.00
4700-5400	$ 18.00	$ 18.00
5400-6000	$ 19.00	$ 19.00
6000-7000	$ 20.00	$ 20.00
7000-8000	$ 21.00	$ 21.00

Supplemental benefits per hour:

Hour terms at the following dollar amounts:

0 to 4000	to 4700	to 5400	to 6000	to 8000
$ 2.50	$ 3.50	$ 4.50	$ 5.50	$ 7.50

3-9-Pltr

Mason - Building — 01/01/2022

JOB DESCRIPTION Mason - Building **DISTRICT** 5

ENTIRE COUNTIES
Erie, Niagara

PARTIAL COUNTIES
Cattaraugus: Only the Township of Perrysburg and the Village of Gowanda.

WAGES
Per Hour: 07/01/2021
Building:

Bricklayer	$ 32.57
Stone Mason	32.57
Tuck Pointer	32.57

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:

Journeyman	$ 31.26

OVERTIME PAY
See (B,E,E2*,Q) on OVERTIME PAGE
*Note - Or other conditions beyond the employer's control such as fire or natural disaster.

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

REGISTERED APPRENTICES
Wages per hour:

1250 hour terms at the following wage:

1st	2nd	3rd	4th
$ 25.87	$ 26.01	$ 27.72	$ 30.21

Supplemental benefits per hour:

1st	2nd	3rd	4th
$ 12.35	$ 18.61	$ 23.30	$ 27.22

5-3B-Z3

Mason - Building / Heavy&Highway — 01/01/2022

JOB DESCRIPTION Mason - Building / Heavy&Highway **DISTRICT** 3

ENTIRE COUNTIES
Erie

PARTIAL COUNTIES
Cattaraugus: Only the Township of Perrysburg and the Village of Gowanda.

WAGES

Per hour:	07/01/2021	07/01/2022 Additional
Cement Mason	$ 31.00	$ 1.15

Additional $0.25 per hr for Swing scaffold or exterior scaffold 42' or higher.
Additional $1.00 per hr when required to wear respirator.

SUPPLEMENTAL BENEFITS
Per hour:

$ 33.07

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

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

REGISTERED APPRENTICES
Wages per hour:

750 hour terms at the following dollar amounts:

1st	2nd	3rd	4th	5th	6th
$ 15.63	$ 17.19	$ 20.25	$ 23.31	$ 26.44	$ 29.56

Supplemental benefits per hour:

1st	2nd	3rd	4th	5th	6th
$ 8.86	$ 11.86	$ 11.80	$ 15.05	$ 17.21	$ 20.54

3-111Erie

Mason - Heavy&Highway 01/01/2022

JOB DESCRIPTION Mason - Heavy&Highway **DISTRICT** 5

ENTIRE COUNTIES
Allegany, Broome, Chautauqua, Chemung, Chenango, Cortland, Delaware, Genesee, Livingston, Monroe, Ontario, Orleans, Otsego, Schuyler, Seneca, Steuben, Tioga, Tompkins, Wayne, Wyoming, Yates

PARTIAL COUNTIES
Cattaraugus: Enitre county except in the Township of Perrysburg and the Village of Gowanda only the Bricklayer classification applies.
Erie: Only the Bricklayer classification applies.
Niagara: Only the Bricklayer classification applies.

WAGES

Per hour:	07/01/2021
Heavy & Highway:	
Cement Mason	$ 32.53
Bricklayer	32.53

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:

Journeyman	$ 23.13

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

HOLIDAY

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

REGISTERED APPRENTICES
Wages per hour:

1500 hour terms at the following percentage of Journeyman's wage:

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

Supplemental benefits per hour:

1st term	$ 14.13
2nd - 4th term	23.13

5-3h

Mason - Tile Finisher 01/01/2022

JOB DESCRIPTION Mason - Tile Finisher **DISTRICT** 5

ENTIRE COUNTIES
Erie, Niagara, Orleans

PARTIAL COUNTIES
Cattaraugus: Only the Township of Perrysburg and the Village of Gowanda.

WAGES

Per hour:	07/01/2021
Building:	
Marble, Slate, Terrazzo and Tile Finisher	$ 29.46

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: $ 16.47

OVERTIME PAY
See (B,E,E2*,Q) on OVERTIME PAGE
*Note - Or other conditions beyond the employer's control such as fire or natural disaster.

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

REGISTERED APPRENTICES
Wages per hour:

1200 hours 1st and 2nd term and 1300 hours 3rd term at the following wage:

1st	2nd	3rd
$ 18.84	$ 21.38	$ 24.23

Supplemental benefits per hour:

1st	2nd	3rd
$ 8.64	$ 10.71	$ 12.47

5-3TF - Z3

Mason - Tile Setter — 01/01/2022

JOB DESCRIPTION Mason - Tile Setter **DISTRICT** 5

ENTIRE COUNTIES
Erie, Niagara, Orleans

PARTIAL COUNTIES
Cattaraugus: Only in the Township of Perrysburg and the Village of Gowanda.

WAGES
Per hour: 07/01/2021
Building:
Marble, Slate, Terrazzo and Tile Setter $ 32.60

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: $ 30.73

OVERTIME PAY
See (B,E,E2*,Q) on OVERTIME PAGE
*Note - Or other conditions beyond the employer's control such as fire or natural disaster.

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

REGISTERED APPRENTICES
Wages per hour:

1250 hour terms at the following wage:

1st	2nd	3rd	4th
$ 25.75	$ 25.84	$ 27.33	$ 30.52

Supplemental benefits per hour:

1st	2nd	3rd	4th
$ 12.17	$ 18.43	$ 23.29	$ 26.46

5-3TS - Z3

Millwright — 01/01/2022

JOB DESCRIPTION Millwright **DISTRICT** 12

ENTIRE COUNTIES
Erie, Genesee, Niagara

WAGES

Per hour:	07/01/2021
Building	$ 34.25
Heavy & Highway*	36.25

*All Heavy & Highway Millwright construction will be paid at the rate indicated above. H/H work performed on hazardous waste sites where employees are required to wear protective gear shall receive an additional $2.00 per hour over the Millwright H/H rate for all hours worked on the day protective gear was worn.

NOTE ADDITIONAL PREMIUMS PAID FOR THE FOLLOWING WORK LISTED BELOW (amount subject to any overtime premiums):
- Certified Welders shall receive $1.75 per hour in addition to the current Millwright's rate provided he/she is directed to perform certified welding.
- If a building work site has been declared a hazardous site by the Owner and the use of protective gear (including, as a minimum, air purifying canister-type chemical respirators) are required, then that employee shall receive a $1.50 premium per hour.
- An employee performing the work of a machinist shall receive $2.00 per hour in addition to the current Building Millwright's rate. For the purposes of this premium to apply, a "machinist" is a person who uses a lathe, Bridgeport, milling machine or similar type of tool to make or modify parts.
- When performing work underground at 500 feet and below, the employee shall receive an additional $1.00 per hour.

SUPPLEMENTAL BENEFITS
Per hour Paid:

All Classifications	$ 30.35

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

HOLIDAY

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

REGISTERED APPRENTICES
Wages per hour:

1300 hour terms at the following percentage of Journeyman's wage:

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

Supplemental Benefits per hour worked:

1st	2nd	3rd	4th
$12.26	$ 24.92	$ 26.73	$ 28.54

12-1163-Gen/Nia/Orl/Wyo

Operating Engineer - Building — 01/01/2022

JOB DESCRIPTION Operating Engineer - Building **DISTRICT** 12

ENTIRE COUNTIES
Cattaraugus, Chautauqua, Erie, Orleans, Wyoming

PARTIAL COUNTIES
Genesee: Only that portion of the county that lies west of a line down the center of Route 98 excluding that area that lies within the City of Batavia.

WAGES

CLASS A: Air Hoist, All Boom Type Equipment, All Pans and Carry-Alls, Archer Hoist, Asphalt Curb and Gutter Machines, Asphalt Roller, Asphalt Spreader or Paver, Automatic Fine Grade Machine (CMI or similar, first and second operator), Backhoe and Pullhoe, Backhoe and Pullhoe (tractor mounted, rubber tired), Back Filling Machine, Belt Placer (CMI or similar type), Bending Machine (Pipe), Bituminous Spreader and Mixer, Blacktop Plants (Automated and Non-automated), Blast or Rotary Drill (Truck or Track Mounted), Blower for Burning Brush, Boiler (when used for power), Boom Truck (excluding pick-up and delivery), Boring Machine, Bulldozer, Cableway, Cage Hoist, Caisson Auger, Central Mix Plant (and all concrete batching plants), Cherry Picker, Concrete Cleaning Decontamination Machine Operator, Concrete Curb and Gutter Machine, Concrete Curing Machine, Concrete Cutters (Vermeer or Similar Type), Concrete Mixer (over 1/2 cu yd.), Concrete Pavement Spreaders and Finishers, Concrete Paver, Concrete Pump, Conveyor, Core Drill, Crane, Crusher, Decon of Equipment, Derrick, Dragline, Dredge, Drill Rig (Tractor Mounted), Dual Drum Paver, Electric Pump used in conjunction with Well Point Systems, Elevating Grader (self propelled or towed), Elevator, Excavator (all purpose, hydraulically operated), Farm Tractor with Accessories, Fine Grade Machine, Forklift, Front End Loader, Generator (10 outlets or more), Gradall, Grader, Grout or Gunite Machine, Head Tower, Heavy Equipment Robotics Operator/Mechanic, Helicopter (when used for hoisting), Hoist (one drum), Hoisting Engine, Horizontal Directional Drill Locator, Horizontal Directional Drill Operator, Hydraulic Boom, Hydraulic Hammer (self-propelled), Hydraulic Pipe Jack Machine (or similar type machine), Hydraulic Rock Expander (or similar type machine), Hydraulic System Pumps, Hydro Crane, Hydro Hammer (or similar type), Industrial Tractor, Jersey Spreader, Kolman Plant Loader (and similar type loaders), Laser Screed, Locomotive, Lubrication Truck, Maintenance Engineer, Maintenance, Lubrication Unit or Truck, Mine Hoist, Mixer for Stabilized Base (self-propelled), Monorail, Motorized Hydraulic Pin Puller, Motorized Hydraulic Seeder, Mucking Machine, Mulching Machine, Multiple Drum Hoist (more than one drum in use), Overhead Crane, Peine Crane (or similar type), Pile Driver, Plant Engineer, Pneumatic Mixer, Post Hole Digger and Driver, Power Broom, Pump Crete, Push Button Hoist, Push or Snatch Cat, Quarry Master or equivalent, Road Widener, Rock Bit Sharpener (all types), Roller (all), Rolling Machine (pipe), Rotomill, Scissors Trucks, Lift, or Boom Lift of any type (when used for hoisting), Scoopmobile, Shovel, SideBoom, Skidsteer/Bobcat (Similar Type), Skimmer, Slip Form Paver (CMI or similar type), Snorkel/Vacuum Truck, Strato-Tower, Stump Chipping Machine, Tire Truck and Drivers performing tire repair (exclude outside vendor), Towed Roller, Tractor Drawn Belt-Type Grader/Loader, Tractor Shovel, Tractor with Towed Accessories, Tractor (when using winch power), Tractors, Trencher, Truck Crane, Truck Mechanic and Helper (exclude Teamsters when repairing their own trucks), Tunnel Shovel, Tube Finisher (CMI and similar type), Ultra High Pressure Waterjet Cutting Tool System Operator/Mechanic, Vacuum Blasting Machine Operator/Mechanic, Vibratory Compactor, Vibro Tamp, Well Drilling Machine, Well Point, Winch, Winch Truck with A Frame.

CLASS B: Aggregate Bin, Aggregate Plant, Apprentice Engineer, Apprentice Engineer Driver, Articulated Off Road Material Hauler, Boiler (used in conjunction with production), CMI and similar type Concrete Spreads (Apprentice Engineer), Cement Bin, Chipping Machine and Chip Spreader, Compressors (4 or less), Compressors (any size, but subject to other provisions for Compressors, Dust Collectors, Generators, Mechanical Heaters, Pumps, Welding Machines - four of any type or combination), Concrete Mixer (1/2 cu. yd. and under), Fireman, Form Tamper, Form Trucks (excluding Teamster or delivery), Fuel Truck or Drivers (exclude Teamster or delivery), Heaters, Heating Boiler (used for temporary heat), Helper on Lubrication Unit or Truck, Jeep Trencher, Power Heaterman, Power Plant in excess of 10 K.W., Pumps, Revinius Widener, Steam Boilers (if manning or license by local law is required), Steam Cleaner (when used for cleaning equipment on the job site), Welding Machine (1 machine over 300 amps or 2 or 3 machines regardless of amps).

Operating Engineer- Building:

Per hour:	07/01/2021
Class A	$ 38.51
Class B	34.03
Crane(Up to 60 Tons)	40.01
" (61 to 199 Tons)	42.01
" (200 to 399 Tons)	42.51
" (400 Tons or more)	43.01

Additional $5.00/hr. for Any Tower Crane
Additional $2.50/hr. for Hazardous Work Site
Additional $1.00/hr. for Tunnel Work

SUPPLEMENTAL BENEFITS
Per Hour:

Journeyman	$ 31.55**

**Note: For Overtime Hours $23.35 of this amount is paid a straight time, the remaining balance of $8.20 is paid at the same premium as the wage.

OVERTIME PAY
See (B, E, *E2, P, **V) on OVERTIME PAGE
* Only Saturdays between October 15th and April 15th.

HOLIDAY

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

REGISTERED APPRENTICES
Wages per hour:
1 year Terms

1st	2nd	3rd	4th
$28.35	$29.24	$30.12	$31.01

Supplemental benefits Per Hour:
All Apprentices $30.65**

**Note: For Overtime Hours $23.35 of this amount to be paid a straight time rate remaining balance of $7.30 is paid at same premium as the wage.

12-17b

Operating Engineer - Heavy&Highway **01/01/2022**

JOB DESCRIPTION Operating Engineer - Heavy&Highway **DISTRICT** 12

ENTIRE COUNTIES
Chautauqua, Erie, Niagara, Orleans

WAGES
Marine Construction/Dredging

Class 1: Diver/Wet Tender, Engineer, Engineer(hydraulic dredge), Blaster.

Class 2(A): Crane, Backhoe Operator, Material Handler, ALL Self-propelled Drill Rigs, Mechanic/Welder, Asst. Engineer(hydraulic dredge), Leverman(hydraulic dredge), Diver/Dry Tender.

Class 2(B): Friction, Lattice Boom, or Crane License Certificate, Endorse Tug or Tow Boat Operator.

Class 3: Deck Equipment Operator, (Machineryman), Maintenance of Crane, Tug/Launch Operator, Loader/Dozer on Barge.

Class 4: Deck Equipment Operator and Machineryman/Fireman on 4 equipment units or more, Off Road Trucks, Deck Hand, Tug Engineer, Crane Maintenance(50 tons and under/ backhoe 115,000lbs or less), Asst. Tug Operator, Blaster Helper.

Per hour:	07/01/2021
Class 1	$ 48.80
Class 2(A)	47.30
Class 2(B)	50.30
Class 3	42.10
Class 4	35.00

Hazardous/Toxic Waste based on EAP Levels
Additional:
Level A - $2.50/Hr.
Level B - 2.00/Hr.
Level C - 1.00/Hr.
Level D - 0.50/Hr.

SUPPLEMENTAL BENEFITS
Per Hour Paid:

ALL CLASSES	$ 32.04

OVERTIME PAY
See (B, E, I, *S) on OVERTIME PAGE
* If the Holiday is Worked

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

12-17 Marine

Operating Engineer - Heavy&Highway **01/01/2022**

JOB DESCRIPTION Operating Engineer - Heavy&Highway **DISTRICT** 12

ENTIRE COUNTIES
Cattaraugus, Chautauqua, Erie, Niagara, Orleans, Wyoming

PARTIAL COUNTIES
Genesee: Only that portion of the county that lies west of a line down the center of Route 98 excluding that area that lies within the City of Batavia.

WAGES

CLASS A: Air Hoist, All Boom Type Equipment, All Pans and Carry-Alls, Asphalt Curb and Cutter Machines, Asphalt Roller, Asphalt Spreader or Paver, Automatic Fine Grade Machine (CMI or similar, first and second operator), Backhoe and Pullhoe (all), Back Filling Machine, Belt Placer (CMI or similar type), Bending Machine (pipe), Bituminous Spreader and Mixer, Blacktop Plant (all), Blast or Rotary Drill (Truck or Track Mounted), Blower for Burning Brush, Boiler (when used for power), Boom Truck, Boring Machine, Bulldozer, Cableway, Cage Hoist, Caisson Auger, Central Mix Plant (and all Concrete Batching Plants), Cherry Picker, Concrete Cleaning Decontamination Machine, Concrete Curb and Gutter Machine, Concrete Curing Machine, Concrete Mixer (over 1/2 cu. yd.), Concrete Pavement Spreaders and Finishers, Concrete Paver, Concrete Pump, Concrete Saw (self propelled), Conveyor, Convoying Vehicles Convoying Engineer's Equipment, Core Drill, Crane, Crusher, Decontamination of Equipment, Derrick, Dragline, Dredge, Drill Rig (Tractor Mounted), Dual Drum Paver, Electric Pump used in conjunction with Well Point Systems, Elevating Grader (self propelled or towed), Elevator, Excavator (all purpose, hydraulically operated), Farm Tractor with Accessories, Fine Grade Machine, Forklift, Front End Loader, Gradall, Grader, Grout or Gunite Machine, Head Tower, Heavy Equipment Robotics Operator/Mechanic, Hoist (all types), Hoisting Engine, Horizontal Directional Drill Locator, Horizontal Directional Drill Operator, Hydraulic Boom, Hydraulic Hammer (self propelled), Hydraulic Pipe Jack Machine, (or similar type machine), Hydraulic Rock Expander (or similar type machine), Hydraulic System Pumps, Industrial Tractor, Jersey Spreader, Kolman Plant Loader (and similar type Loaders), Laser Screed, Locomotive, Log Skidder (similar type), Maintenance Engineer, Maintenance, Lubrication Unit or Truck, Mine Hoist, Mixer for Stabilized Base (self propelled), Monorail, Motorized Hydraulic Pin Puller, Motorized Hydraulic Seeder, Mucking Machine, Mulching Machine, Overhead Crane, Parts Chasing, Peine Crane (or similar type), Pile Driver, Plant Engineer, Pneumatic Mixer, Post Hole Digger and Post Driver, Power Broom, Pump Crete, Push Button Hoist, Push or Snatch Cat, Quarry Master (or equivalent), Road Widener, Rock Bit Sharpener (all types), Roller (all), Rolling Machine (Pipe), Rotomill, Scoopmobile, Shovel, Side Boom, Skidsteer/Bobcat (similar type), Skimmer, Slip Form Paver (CMI or similar, first and second operator), Snorkel/Vacuum Truck, Strato-Tower, Tire Truck & Repair, Towed Roller, Tractor Drawn Belt-Type Grader/Loader, Tractor Shovel, Tractor with Towed Accessories, Tractors (when using winch power), Trencher, Truck Crane, Tug Boats, Tunnel Shovel, Tube Finisher (CMI and similar), Vacuum Blasting Machine Operator/Mechanic, Vibratory Compactor, Vibro Tamp, Waterjet Cutting Tool System Operator/Mechanic (Ultra High Pressure), Well Drilling Machine, Well Point, Winch, Winch Truck with A Frame.

CLASS B: Aggregate Bin, Aggregate Plant, Apprentice Engineer, Apprentice Engineer Driver, Articulated Off Road Material Hauler, CMI and similar type Concrete Spreads (Apprentice Engineer), Cement Bin, Chipping Machine and Chip Spreader, Compressors (4 or less), Compressors: any size, but subject to other provisions for Compressors, Dust Collectors, Generators, Mechanical Heaters, Pumps, Welding Machines (four of any type or combination), Concrete Mixer (1/2 cu. yd. and under), Fireman, Form Tamper, Fuel Truck, Heating Boiler (used for temporary heat), Helper on Lubrication Unit or Truck, Jeep Trencher, Power Heaterman, Power Plant in excess of 10 K.W., Pumps (4" or over), Revinius Widener, Steam Cleaner, Stump Chipping Machine, Welding Machine (1 machine over 300 amps or 2 or 3 machines regardless of amps).

Operating Engineer- Heavy/Highway, Sewer/Water, Tunnel:

Per hour:	07/01/2021
Class A	$ 40.64
Class B	36.14
Crane 5 to 60 tons	43.64
" 61 to 199 tons	44.14
" 200 to 399 tons	44.64
" 400 and over	45.14

Additional $2.50/hr. for Hazardous Work Site
Additional $1.00/hr. for Tunnel Work
Additional $4.00/hr. for Mandated Off-Shift Work

SUPPLEMENTAL BENEFITS
Per hour:

Journeymen	$ 33.16*

*Note: For Overtime Hours $25.21 of the amount paid at straight time, the remaining balance of 7.95 is paid at the same premium as the wage.

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

HOLIDAY
Paid: See (*5, **6) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
*Saturday Holidays will be recognized on the Friday before
**Sunday Holidays will be recognized on the Monday after

REGISTERED APPRENTICES
Wages per hour:
Apprentices at 1 year terms

1st	2nd	3rd	4th
$33.14	$34.14	$35.14	$36.14

Supplemental Benefits

All Apprentices $ 32.76*

*Note: For Overtime Hours $25.21 of the amount paid at straight time, the remaining balance of $7.55 is paid at same premium as the wage.

12-17 hh/sw/t

Operating Engineer - Survey Crew 01/01/2022

JOB DESCRIPTION Operating Engineer - Survey Crew **DISTRICT** 12

ENTIRE COUNTIES
Cattaraugus, Chautauqua, Erie, Niagara, Orleans, Wyoming

PARTIAL COUNTIES
Genesee: Only that portion of the county that lies west of a line down the center of Route 98 excluding that area that lies within the City of Batavia.

WAGES
These rates apply to Building, Heavy and Highway Construction.

Per hour:
SURVEY CLASSIFICATIONS:

Party Chief - One who directs a survey party.
Instrument Person - One who operates the surveying instruments.
Rod Person - One who holds the rods and assists the Instrument Person.

	07/01/2021
Party Chief	$ 44.09
Instrument Person	41.57
Rod Person	28.75

Additional $3.00 per hr. for work in a Tunnel.
Additional $2.50 per hr. for EPA or DEC certified toxic or hazardous waste work.

SUPPLEMENTAL BENEFITS
Per hour worked:

Journeyman $ 28.75

OVERTIME PAY
See (B, E, Q, *X) on OVERTIME PAGE
*Note: $23.75 Only for "ALL" premium hours when worked.

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

REGISTERED APPRENTICES
WAGES:1000 hour terms based on the Percentage of Rod Person wage:

	07/01/2021
0-1000 Hrs	60%
1001-2000 Hrs	70%
2001-3000 Hrs	80%

SUPPLEMENTAL BENEFITS per hour worked:

0-1000 Hrs	$ 17.25 / PHP $13.29
1001-2000 Hrs	20.13 / " 15.51
2001-3000 Hrs	23.00 / " 18.12

NOTE: PHP is premium hours paid when worked.

12-17D Sur

Operating Engineer - Survey Crew - Consulting Engineer 01/01/2022

JOB DESCRIPTION Operating Engineer - Survey Crew - Consulting Engineer **DISTRICT** 12

ENTIRE COUNTIES
Cattaraugus, Chautauqua, Erie, Niagara, Orleans, Wyoming

PARTIAL COUNTIES
Genesee: Only that portion of the county that lies west of a line down the center of Route 98 excluding that area that lies within the City of Batavia.

WAGES
These rates apply to feasibility and preliminary design surveying, line of grade surveying for inspection or supervision of construction when performed under a Consulting Engineer Agreement.

Per hour:
SURVEY CLASSIFICATIONS:

Party Chief - One who directs a survey party.
Instrument Person - One who operates the surveying instruments.
Rod Person - One who holds the rods and assists the Instrument Person.

	07/01/2021
Party Chief	$ 44.09
Instrument Person	41.57
Rod Person	28.75

SUPPLEMENTAL BENEFITS
Per hour worked:

Journeyman	$ 28.75

OVERTIME PAY
See (B, E, Q, *X) on OVERTIME PAGE
*Note: $23.75 Only for "ALL" premium hours paid.

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

REGISTERED APPRENTICES
WAGES: 1000 hour terms based on the Percentage of Rod Persons Wage:

	07/01/2021
0-1000	60%
1001-2000	70%
2001-3000	80%

SUPPLEMENTAL BENEFITS per hour worked:

0-1000	$ 17.25 / PHP $13.29
1001-2000	20.13 / " 15.51
2001-3000	23.00 / " 18.12

NOTE: PHP is premium hours paid when worked.

12-17D Con Eng

Painter — 01/01/2022

JOB DESCRIPTION Painter **DISTRICT** 3

ENTIRE COUNTIES
Allegany, Erie, Genesee, Niagara, Orleans, Wyoming

PARTIAL COUNTIES
Cattaraugus: Entire County except the Townships of Conewango, Leon, Napoli, New Albion, Randolph and South Valley.
Chautauqua: Only the Townships of Awkright, Dunkirk, Hanover, Pomfret, Portland, Sheridan and Villenova.
Livingston: Only the Townships of North Dansville, Nunda, Ossian,Portage, Sparta, Spring Water and West Sparta.
Steuben: Only the Townships of Avoca, Canisteo, Cohocton, Dansville,Fremont, Greenwood, Hartsville, Hornellsville, Howard, Jasper, Prattsburg, Pulteney, Troupsburg, Tuscarora, Urbana, Wayland, Wayne, Woodhull, West Union, Wheeler, and the City of Hornell.

WAGES
Per hour: 07/01/2021

Basic Rate (Brush & Roll)	$ 28.00
Spray painting, wallcovering	28.00
Abrasive and hydroblasting	28.00
Taping/DryWall Finisher	28.50

Skeleton Steel*	28.75

* Skeleton Steel: No floors, walls or ceiling are constructed, including radio and television towers, flagpoles, smokestacks, cranes and the abatement of coatings with lead, asbestos and/or arsenic, etc. All work within the confines of a plant shall be paid the skeleton steel rate (except in-plant tank work (see Tank Rate)).

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:

$ 25.79

OVERTIME PAY
Exterior work only See (B, E4, F*, R) on OVERTIME PAGE.
All other work See (B, F*, R) on OVERTIME PAGE.
* Note - Saturday is payable at straight time if the employee misses work, except where a doctor's or hospital verification of illness is produced Monday through Friday when work was available to the employee.

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

REGISTERED APPRENTICES
Wages per hour:

Painter/Decorator: 750 hour terms at the following percentage of Journeyman's Basic wage rate:

1st	2nd	3rd	4th	5th	6th	7th	8th
50%	55%	60%	65%	70%	75%	80%	90%

Taper/Drywall Finisher: 750 hour terms at the following percentage of Journeyman's Taper wage:

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

Supplemental benefits per hour:

Painter/Decorator and Taper/Drywall Finisher:

1st	2nd	3rd	4th	5th	6th	7th	8th
$ 2.35	$ 4.35	$ 5.35	$ 5.85	$ 6.35	$ 6.85	$ 7.35	$ 7.60

3-4-Buf, Nia, Olean

Painter — 01/01/2022

JOB DESCRIPTION Painter **DISTRICT** 3

ENTIRE COUNTIES
Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Cortland, Delaware, Erie, Genesee, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Niagara, Oneida, Onondaga, Ontario, Orleans, Oswego, Otsego, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Wayne, Wyoming, Yates

WAGES

Per hour:	07/01/2021
Bridge	$ 40.00
Tunnel	40.00
Tank*	38.00

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.

Tank rate applies to indoor and outdoor tanks, tank towers, standpipes, digesters, waste water treatment tanks, chlorinator tanks, etc. Covers all types of tanks including but not limited to steel tanks, concrete tanks, fiberglass tanks, etc.

Note an additional $1.00 per hour is required when the contracting agency or project specification requires any shift to start prior to 6:00am or after 12:00 noon.

SUPPLEMENTAL BENEFITS
Per hour:

$ 29.20

OVERTIME PAY
Exterior work only See (B, E4, F*, R) on OVERTIME PAGE.
All other work See (B, F*, R) on OVERTIME PAGE.
*Note - Saturday is payable at straight time if the employee misses work, except where a doctor's or hospital verification of illness is produced Monday through Friday when work was available to the employee.

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

REGISTERED APPRENTICES
Wages per hour:

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

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

Supplemental benefits per hour:

1st & 2nd terms	$ 5.50	$ 5.51
3rd & 4th terms	5.50	5.51
5th & 6th terms	6.50	6.51

3-4-Bridge, Tunnel, Tank

Painter - Metal Polisher — 01/01/2022

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 — 01/01/2022

JOB DESCRIPTION Plumber **DISTRICT** 3

ENTIRE COUNTIES
Erie, Niagara, Wyoming

PARTIAL COUNTIES
Allegany: Only the Townships of Allen, Angelica, Belfast, Caneadea, Centerville, Granger, Hume, New Hudson and Rushford
Cattaraugus: Only the Townships of Ashford, Dayton, East Otto, Ellicottville, Farmersville, Franklinville, Freedom, Leon, Lyndon, Machias, Mansfield, New Albion, Otto, Perrysburg, Persia and Yorkshire.
Chautauqua: Only the Townships of Arkwright, Charlotte, Cherry Creek, Dunkirk, Hanover, Pomfret, Portland, Ripley, Sheridan, Stockton, Villenova, Westfield, City of Dunkirk and Village of Fredonia.
Genesee: Only the Townships of Alabama, Alexander, Batavia, Darien, Elba, Oakfield, Pembroke and the City of Batavia.
Orleans: Only the Townships of Ridgeway, Shelby and Yates.

WAGES
Per hour: 07/01/2021

Plumber	$ 37.15
Steamfitter	$ 37.15

Note - Add 10% (ten-percent) to wage when HAZMAT training is required or when OSHA compliant respirator protection is required.

SUPPLEMENTAL BENEFITS
Per hour:

$ 27.51

Note - $4.38 of this amount must be paid at the same premium as the wage.

OVERTIME PAY
See (*B, **E, Q) on OVERTIME PAGE
* Double time after 11 hours per day on Weekdays.
** Double time after 10 hours per day on Saturday.

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

REGISTERED APPRENTICES
Wages per hour:

One year terms at the following percentage of Journeyman's wage:

1st	2nd	3rd	4th	5th
45%	55%	65%	75%	90%

Note - Add 10% (ten-percent) to wage when HAZMAT training is required or when OSHA compliant respirator protection is required.

Supplemental benefits per hour:

$ 22.82

Note - $4.38 of this amount must be paid at the same premium as the wage.

3-22-Buffalo, Niagara

Roofer — 01/01/2022

JOB DESCRIPTION Roofer **DISTRICT** 3

ENTIRE COUNTIES
Erie, Genesee, Niagara, Orleans, Wyoming

WAGES
Per hour: 07/01/2021

Asbestos Removal	$ 33.96
Slate, Tile	31.11
Precast tile / slabs	31.11
Crete / gypsum planks	31.11
Damp and waterproofer	30.96
Composition, sprayers,	30.96
Aspalt mastic,	30.96
Steep roofers	30.96

When shift work is mandated either in the job specification or by the contracting agency the following premiums apply:
15.0% for work from 4:30PM - 1:00AM or second shift
20.0% for work from 12:30AM - 9:00AM or third shift

SUPPLEMENTAL BENEFITS
Per hour:

$ 23.01

OVERTIME PAY
See (B, *E, **E2, Q) on OVERTIME PAGE
* and ** Double time after 8 hours on Saturday.

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

REGISTERED APPRENTICES
Wages per hour:

Hour terms at the following percentage of Journeyman's wage:

0 to 499	to 999	to 1499	to 1999	to 2499	to 2999	to 3499	to 4499
60%	65%	70%	75%	80%	85%	90%	95%

Supplemental benefits per hour:

0 to 499	to 999	to 1499	to 1999	to 2499	to 2999	to 3499	to 4499
$ 8.21	$ 8.21	$ 12.34	$ 12.54	$ 20.32	$ 20.99	$ 21.66	$ 22.34

3-74

Sheetmetal Worker — 01/01/2022

JOB DESCRIPTION Sheetmetal Worker **DISTRICT** 3

ENTIRE COUNTIES
Erie, Genesee, Niagara, Orleans, Wyoming

WAGES
Per hour: 07/01/2021

Sheet Metal Worker $ 35.00

Additional $0.50 per hour for work more than 30" above floor on boatswain chair.
Additional $1.00 per hour for work in "Hot" areas of atomic laboratories, atomic plants, or any premises where radio-active materials are stored or handled and personal protective equipment is required.
Additional $1.00 per hour for work when required to have 40-hour HAZMAT training or the use of OSHA compliant respirator is required.

When shift work is mandated either in the job specification or by the contracting agency the following premiums apply:
Shift Premium per hour:

Second Shift	$ 3.25
Third Shift	$ 5.00

SUPPLEMENTAL BENEFITS
Per hour:

$ 27.47*

* Note - $17.57 of this amount must be paid at the same premium as the wages per overtime hours.

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

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

REGISTERED APPRENTICES
Wages per hour:

One year terms at the following wage:

1st term	$ 15.75
2nd term	20.60
3rd term	22.04
4th term	26.36
5th term	29.24

Supplemental benefits per hour:

1st term	$ 15.94	Note - $8.04 of this amount must be paid at the same premium as the wage.
2nd term	19.04	Note - $11.14 of this amount must be paid at the same premium as the wage.
3rd term	24.68	Note - $14.78 of this amount must be paid at the same premium as the wage.
4th term	25.61	Note - $15.71 of this amount must be paid at the same premium as the wage.
5th term	26.23	Note - $16.33 of this amount must be paid at the same premium as the wage.

When shift work is mandated either in the job specification or by the contracting agency the following premiums apply;
Shift Premium per hour:

Second Shift

1st term	$ 1.46
2nd term	$ 1.63
3rd term	$ 1.79
4th term	$ 2.28
5th term	$ 2.60

Third Shift

1st term	$ 2.25
2nd term	$ 2.50
3rd term	$ 2.75
4th term	$ 3.50
5th term	$ 4.00

3-71

Sprinkler Fitter — 01/01/2022

JOB DESCRIPTION Sprinkler Fitter **DISTRICT** 1

ENTIRE COUNTIES
Allegany, Broome, Cattaraugus, Cayuga, Chautauqua, Chemung, Chenango, Clinton, Columbia, Cortland, Delaware, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orleans, Oswego, Otsego, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Washington, Wayne, Wyoming, Yates

WAGES
Per hour 07/01/2021

Sprinkler Fitter $ 36.33

SUPPLEMENTAL BENEFITS
Per hour

Journeyperson $ 27.14

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
$ 17.48	$ 19.43	$ 21.12	$ 23.06	$ 25.00	$ 26.95	$ 28.89	$ 30.83	$ 32.77	$ 34.72

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

Teamster - Building / Heavy&Highway **01/01/2022**

JOB DESCRIPTION Teamster - Building / Heavy&Highway **DISTRICT** 3

ENTIRE COUNTIES
Erie, Niagara

PARTIAL COUNTIES
Genesee: Only in the Townships of Alabama, Darien and Pembroke.
Orleans: Only the Townships of Ridgeway, Shelby and Yates.
Wyoming: Only in the Townships of Arcade, Bennington, Java and Sheldon.

WAGES
GROUP 1: Warehousemen, Yardmen, Truck Helpers, Pickups, Panel Trucks, Flatboy Material Trucks (straight jobs), Single Axle Dump Trucks, Dumpsters, Material Checkers and Receivers, Greasers, Truck Tiremen, Mechanics Helpers and Parts Chasers.

GROUP 2: Tandems and Batch Trucks, Mechanics, Dispatcher.

GROUP 3: Semi-Trailers, Low-Boy Trucks, Asphalt Distributor Trucks and Agitator, Mixer Trucks and dumpcrete type vehicles, Truck Mechanic, Fuel Trucks

GROUP 4: Specialized Earth Moving Equipment, Euclid type, or similar off-highway, where not self-loading, Straddle (Ross) Carrier, and self -contained concrete mobile truck.

GROUP 5: Off-highway Tandem Back-Dump, Twin Engine Equipment and Double-Hitched Equipment where not self-loading.

Per hour:	07/01/2021
All GROUPS	$ 41.22

Add $2.00 when required to use personal protection when performing hazardous waste removal work.
An additional $3.00 per hour is required when a single irregular work shift starting any time from 5:00PM to 1:00AM is mandated either in the job specification or by the contracting agency.

SUPPLEMENTAL BENEFITS
Per hour:

$ 15.36*

*Note - Only $ 7.16 per hour needs to be paid for overtime hours.

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

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

3-449

Teamster - Building / Heavy&Highway **01/01/2022**

JOB DESCRIPTION Teamster - Building / Heavy&Highway **DISTRICT** 3

ENTIRE COUNTIES
Erie, Niagara

WAGES

Per hour:	07/01/2021
Dump Truck Operator*	$ 24.25

*Does not include Single Axle Dump Trucks (see Teamster Group 1).
*Does not include Off-highway Dump Trucks (see Teamster Groups 2-5).

SUPPLEMENTAL BENEFITS
Per hour:

$ 1.73

OVERTIME PAY
See (B, B2, Q) on OVERTIME PAGE

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

Welder **01/01/2022**

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
- ☐ 1O Village
- ☐ 11 Town
- ☐ 12 County
- ☐ 13 Other Non-N.Y. State (Describe)

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

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

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

- ☐ New Schedule of Wages and Supplements.
  APPROXIMATE BID DATE :
- ☐ Additional Occupation and/or Redetermination

PRC NUMBER ISSUED PREVIOUSLY FOR THIS PROJECT :

OFFICE USE ONLY

B. PROJECT PARTICULARS

5. Project Title

Description of Work

Contract Identification Number

Note: For NYS units, the OSC Contract No.

6. Location of Project:
Location on Site

Route No/Street Address

Village or City

Town

County

7. Nature of Project - Check One:

- ☐ 1. New Building
- ☐ 2. Addition to Existing Structure
- ☐ 3. Heavy and Highway Construction (New and Repair)
- ☐ 4. New Sewer or Waterline
- ☐ 5. Other New Construction (Explain)
- ☐ 6. Other Reconstruction, Maintenance, Repair or Alteration
- ☐ 7. Demolition
- ☐ 8. Building Service Contract

8. OCCUPATION FOR PROJECT :

- ☐ Construction (Building, Heavy Highway/Sewer/Water)
- ☐ Tunnel
- ☐ Residential
- ☐ Landscape Maintenance
- ☐ Elevator maintenance
- ☐ Exterminators, Fumigators
- ☐ Fire Safety Director, NYC Only
- ☐ Guards, Watchmen
- ☐ Janitors, Porters, Cleaners, Elevator Operators
- ☐ Moving furniture and equipment
- ☐ Trash and refuse removal
- ☐ Window cleaners
- ☐ Other (Describe)

9. Has this project been reviewed for compliance with the Wicks Law involving separate bidding? YES ☐ NO ☐

10. Name and Title of Requester

Signature

SEE PAGE TWO FOR LAWS RELATING TO PUBLIC WORK CONTRACTS

NEW YORK STATE DEPARTMENT OF LABOR
Bureau of Public Work - Debarment List

LIST OF EMPLOYERS INELIGIBLE TO BID ON OR BE AWARDED ANY PUBLIC WORK CONTRACT

Under Article 8 and Article 9 of the NYS Labor Law, a contractor, sub-contractor and/or its successor shall be debarred and ineligible to submit a bid on or be awarded any public work or public building service contract/sub-contract with the state, any municipal corporation or public body for a period of five (5) years from the date of debarment when:

- Two (2) final determinations have been rendered within any consecutive six-year (6) period determining that such contractor, sub-contractor and/or its successor has WILLFULLY failed to pay the prevailing wage and/or supplements;
- One (1) final determination involves falsification of payroll records or the kickback of wages and/or supplements.

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 12/22/2021

Article 8

AGENCY	Fiscal Officer	FEIN	EMPLOYER NAME	EMPLOYER DBA NAME	ADDRESS	DEBARMENT START DATE	DEBARMENT END DATE
DOL	DOL	*****5754	0369 CONTRACTORS, LLC		515 WEST AVE UNIT PH 13NORWALK CT 06850	05/12/2021	05/12/2026
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		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		ANGELO GARCIA		515 WEST AVE UNIT PH 13NORWALK CT 06850	05/12/2021	05/12/2026
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	NYC		ARADCO CONSTRUCTION CORP		115-46 132RD ST SOUTH OZONE PARK NY 11420	09/17/2020	09/17/2025
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 CROPSEY AVENUE APT 11GBROOKLYN NY 11214	10/30/2018	10/30/2023
DOL	NYC		AVM CONSTRUCTION CORP		117-72 123RD ST SOUTH OZONE PARK NY 11420	09/17/2020	09/17/2025
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	DOL		BERNARD BEGLEY		38 LONG RIDGE ROAD BEDFORD NY 10506	12/18/2019	12/18/2024
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	*****3627	BJB CONSTRUCTION CORP.		38 LONG RIDGE ROAD BEDFORD NY 10506	12/18/2019	12/18/2024
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	DA		BOLTER CONSTRUCTION		2549 LINDEN STREET BELLMORE NY 11710	12/22/2016	12/22/2021
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 BALDWINSVILLE NY 13027	02/03/2020	01/09/2023
DOL	DOL	*****8809	C.B.E. CONTRACTING CORPORATION		310 MCGUINESS 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	*****4083	C.P.D. ENTERPRISES, INC		P.O BOX 281 WALDEN NY 12586	03/03/2020	03/03/2025
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
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 KISCSO 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 BALDWINSVILLE NY 13027	02/03/2020	02/03/2025
DOL	DOL		CARMENA RACHETTA		8531 OSWEGO ROAD BALDWINSVILLE 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	NYC		CHARLES ZAHRADKA		863 WASHINGTON STREET FRANKLIN SQUARE NY 11010	03/10/2020	03/10/2025
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 PAPASTEFANOU A/K/A CHRIS PAPASTEFANOU		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 DOUGLASTON 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	*****7619	DANCO CONSTRUCTION UNLIMITED INC.		485 RAFT AVENUE HOLBROOK NY 11741	10/19/2021	10/19/2026
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 BALDWINSVILLE NY 13027	02/03/2020	01/09/2023
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 GILLETT PA 16923	03/12/2018	03/12/2023
DOL	DA		EDWIN HUTZLER		2375 RAYNOR STREET RONKONKOMA NY 11779	08/04/2021	08/04/2026
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	DA		FREDERICK HUTZLER		2375 RAYNOR STREET RONKONKOMA NY 11779	08/04/2021	08/04/2026
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	NYC		GAYATRI MANGRU		21 DAREWOOD LANE VALLEY STREAM NY 11581	09/17/2020	09/17/2025
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 BALDWINSVILLE 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		JASON P. RACE		3469 STATE RT. 69 PERISH NY 13131	09/29/2021	09/29/2026
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
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 LATTA 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 LATTA 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 MARKOVIC		47 MANDON TERRACE HAWTHORN NJ 07506	03/29/2021	03/29/2026
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	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING		3469 STATE RT. 69 PERISH NY 13131	09/29/2021	09/29/2026
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 GILLETT 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
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	*****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		MARIA NUBILE		84-22 GRAND AVENUE ELMHURST NY 11373	03/10/2020	03/10/2025
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 PROFESSIONAL PAINTING OF CNY	1229 JAMES STREET SYRACUSE NY 13203	05/02/2017	05/02/2022
DOL	DOL	*****9445	MCLEAN M WALSH	ELITE PROFESSIONAL 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
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	NYC		NAMOW, INC.		84-22 GRAND AVENUE ELMHURST NY 11373	03/10/2020	03/10/2025
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	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	09/29/2021	09/29/2026
DOL	DOL	*****7429	NICOLAE I. BARBIR	BESTUCCO CONSTRUCTION, INC.	444 SCHANTZ ROAD ALLENTOWN PA 18104	09/17/2020	09/17/2025
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		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	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	DA	*****7559	REGAL CONTRACTING INC.		24 WOODBINE AVE NORTHPORT NY 11768	10/01/2020	10/01/2025
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
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		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	DOL		SAL FRESINA MASONRY CONTRACTORS, INC.		1935 TEALL AVENUE SYRACUSE NY 13206	07/16/2021	07/16/2026
DOL	DOL		SAL MASONRY CONTRACTORS, INC.		(SEE COMMENTS) SYRACUSE NY 13202	07/16/2021	07/16/2026
DOL	DOL	*****9874	SALFREE ENTERPRISES INC		P.O BOX 14 2821 GARDNER RDPOMPEI NY 13138	07/16/2021	07/16/2026
DOL	DOL		SALVATORE A FRESINA A/K/A SAM FRESINA		107 FACTORY AVE P.O BOX 11070SYRACUSE NY 13218	07/16/2021	07/16/2026
DOL	DOL		SAM FRESINA		107 FACTORY AVE P.O BOX 11070SYRACUSE NY 13218	07/16/2021	07/16/2026
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	NYC	*****1130	SCANA CONSTRUCTION CORP.		863 WASHINGTON STREET FRANKLIN SQUARE NY 11010	03/10/2020	03/10/2025

DOL	DOL	*****2045	SCOTT DUFFIE	DUFFIE'S ELECTRIC, INC.	P.O BOX 111 CORNWALL NY 12518	03/03/2020	03/03/2025
DOL	DOL		SCOTT DUFFIE		P.O BOX 111 CORNWALL NY 12518	03/03/2020	03/03/2025
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 GILLETT PA 16923	03/12/2018	03/12/2023
DOL	DOL		SHANE BURDICK		2238 BAKER ROAD GILLETT 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	NYC		SOMATIE RAMSUNAHAI		115-46 132ND ST SOUTH OZONE PARK NY 11420	09/17/2020	09/17/2025
DOL	DOL	*****2221	SOUTH BUFFALO ELECTRIC, INC.		1250 BROADWAY ST BUFFALO NY 14212	02/03/2020	02/03/2025
DOL	DOL		STANADOS KALOGELAS		485 RAFT AVENUE HOLBROOK NY 11741	10/19/2021	10/19/2026
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
DOL	DOL		STEVE TATE		415 FLAGER AVE #302STUART FL 34994	10/31/2018	10/31/2023
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	DOL	*****3800	SUBURBAN RESTORATION CO. INC.		5-10 BANTA PLACE FAIR LAWN PLACE NJ 07410	03/29/2021	03/29/2026
DOL	NYC	*****5863	SUKHMANY 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	*****9733	TERSAL CONSTRUCTION SERVICES INC		107 FACTORY AVE P.O BOX 11070SYRACUSE NY 13208	07/16/2021	07/16/2026
DOL	DOL		TERSAL CONTRACTORS, INC.		221 GARDNER RD P.O BOX 14POMPEI NY 13138	07/16/2021	07/16/2026
DOL	DOL		TERSAL DEVELOPMENT CORP.		1935 TEALL AVENUE SYRACUSE NY 13206	07/16/2021	07/16/2026
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	DA	*****4106	TRIPLE H CONCRETE CORP		2375 RAYNOR STREET RONKONKOMA NY 11779	08/04/2021	08/04/2026
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	NYC	*****2426	VICKRAM MANGRU	VICK CONSTRUCTI ON	21 DAREWOOD LANE VALLEY STREAM NY 11581	09/17/2020	09/17/2025
DOL	NYC		VICKRAM MANGRU		21 DAREWOOD LANE VALLEY STREAM NY 11581	09/17/2020	09/17/2025
DOL	DOL		VICTOR ALICANTI		42-32 235TH ST DOUGLASTON 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	*****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 G. PROERFRIEDT		85 SPRUCEWOOD ROAD WEST BABYLON NY 11704	01/19/2021	01/19/2026
DOL	DOL	*****5924	WILLIAM G. PROPHY, LLC	WGP CONTRACTIN G, INC.	54 PENTAQUIT AVE BAYSHORE NY 11706	01/19/2021	01/19/2026
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

APPENDIX D

EASEMENTS

APPENDIX E

ECWA PUMP VFD CONTROLLER DIAGRAMS

480 VAC
3 PHASE
60 HZ

L1
L2
L3

CB1
MAIN CB

250 AMPERE, 600 VOLTS
SCHNEIDER: LJL36250U31X

1L1
1L2
1L3

5/L3 3/L2 1/L1
IC1
6/T3 4/T2 2/T1

2L3 2L2 2L1

A1 B1 C1
LR1
A2 B2 C2

SCHNEIDER ELECTRIC
ALTIVAR 630
ATV630C13N4
AC MOTOR
AJUSTABLE
SPEED DRIVE
CONTROLLER

ENERGIZED W/
NO FAULT
R1A
R1B
R1C

TO PLC INPUT %I0.12
(SHEET 2)
I12
1104

DRIVE IN RUN
R2A
R2C

TO PLC INPUT %I0.13
(SHEET 2)
I13
1104

(3137)
CONTACTOR RELAY
1104 R5 A2 A1 1113

CONTACTOR CONTROL
R3A
R3C

1103

P24 EXTERNAL POWER SUPPLY TERMINAL (+24)
0V EXTERNAL POWER SUPPLY TERMINAL (COM)
DI1 RUN
DI2 NOT ASSIGNED
DI3 NOT ASSIGNED
DI4 FAULT RESET
DI5 DRIVE LOCK
DI6 NOT ASSIGNED
+24 INTERNAL SUPPLY

1103 1103
1104 MCR %Q0.14 1104
1103 23 24 3131 Q14 Q14

%Q0.1 FAULT RESET
1103 MCR DRIVE LOCK Q1
1103 33 34 1111

LCD GRAPHIC
KEYPAD
VW3A1111

GRAPHIC
DISPLAY
TERMINAL
RJ45

MODBUS
EMBEDDED
RJ45

ETHERNET
EMBEDDED
RJ45

R/L1 S/L2 T/L3 GND
3L1 3L2 3L3

GND U/T1 V/T2 W/T3
1T1 1T2 1T3

3L3 3L2 3L1

IC2
YEL 3T3 3T3 6/T3 5/L3 2T3 6/T3 5/L3 1T3
125 HP
ORG 3T2 3T2 4/T2 3/L2 2T2 4/T2 3/L2 1T2
BRN 3T1 3T1 2/T1 1/L1 2T1 2/T1 1/L1 1T1
MOL

1103 1104

FU1 LP-CC-6
FU2 LP-CC-6
H1 H3 H2 H4
CPT1
1500VA
X1 X3 X2 X4
120 VAC
FU3 LP-CC-15
CPN
CPL1

TVSS
5 3 1
L G N
11 1104 TO PLC INPUT %I0.11 (SHEET 2)
12 2113
L G N
6 4 2

1100 1100 1102 1102
N

EMERGENCY STOP
PB1
MOTOR OVERLOAD RELAY
95 96
JUMPER
1100 1130 1131 1132 1132
A1 MCR A2 1102
(1108)
(1135)
(1110)
(2102)

MCR
13 14 1133

MODICON PLC
TM221CE40R
ETHERNET
LINE NEUT GND
+24 V0
TM3TI4
+24 V0
1104 1104

1133

FU11 S504-100MA FU11
1103
FU4 S505-2A FU4
FU5 S505-2A FU5
FU10 S505-4A FU10
FU13 S505-1A FU13
FU14 S505-1A FU14
1103 1104

L 120VAC N
PHOENIX CONTACT
MINI-PS-100-240AC/24DC/4
+ 24VDC-4A -

PROFACE
PFXGP4301TADW
HMI
ETHERNET
RJ45
24VDC
(+) (-) G

PHEONIX ETHERNET
FL SWITCH SFN 8TX
2891002
RJ45 RJ45 RJ45 RJ45
RJ45 RJ45 RJ45 RJ45
24VDC
(+) (-) G

RTU
FRONT DOOR
BULKHEAD

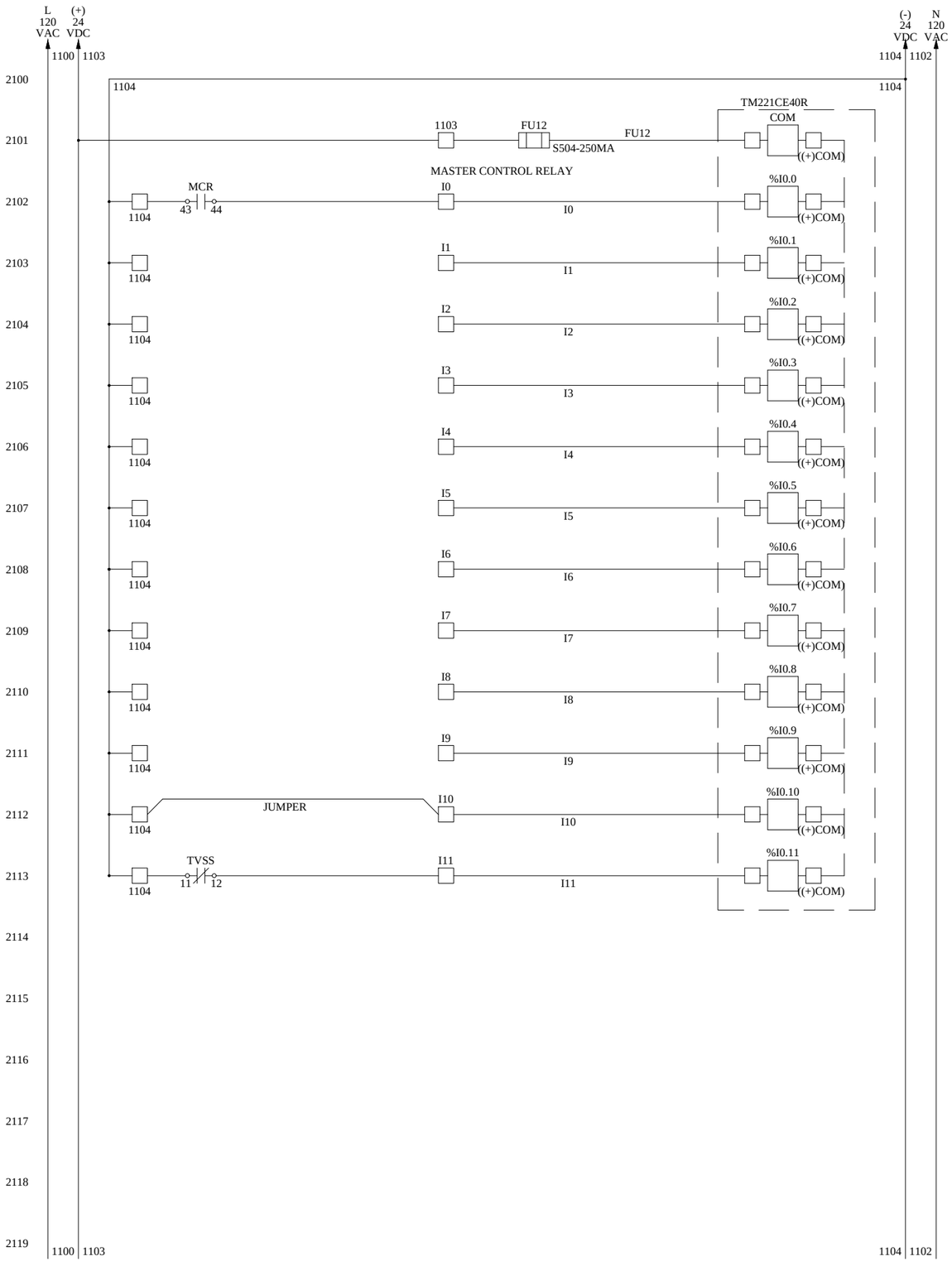
1100 1103 1133

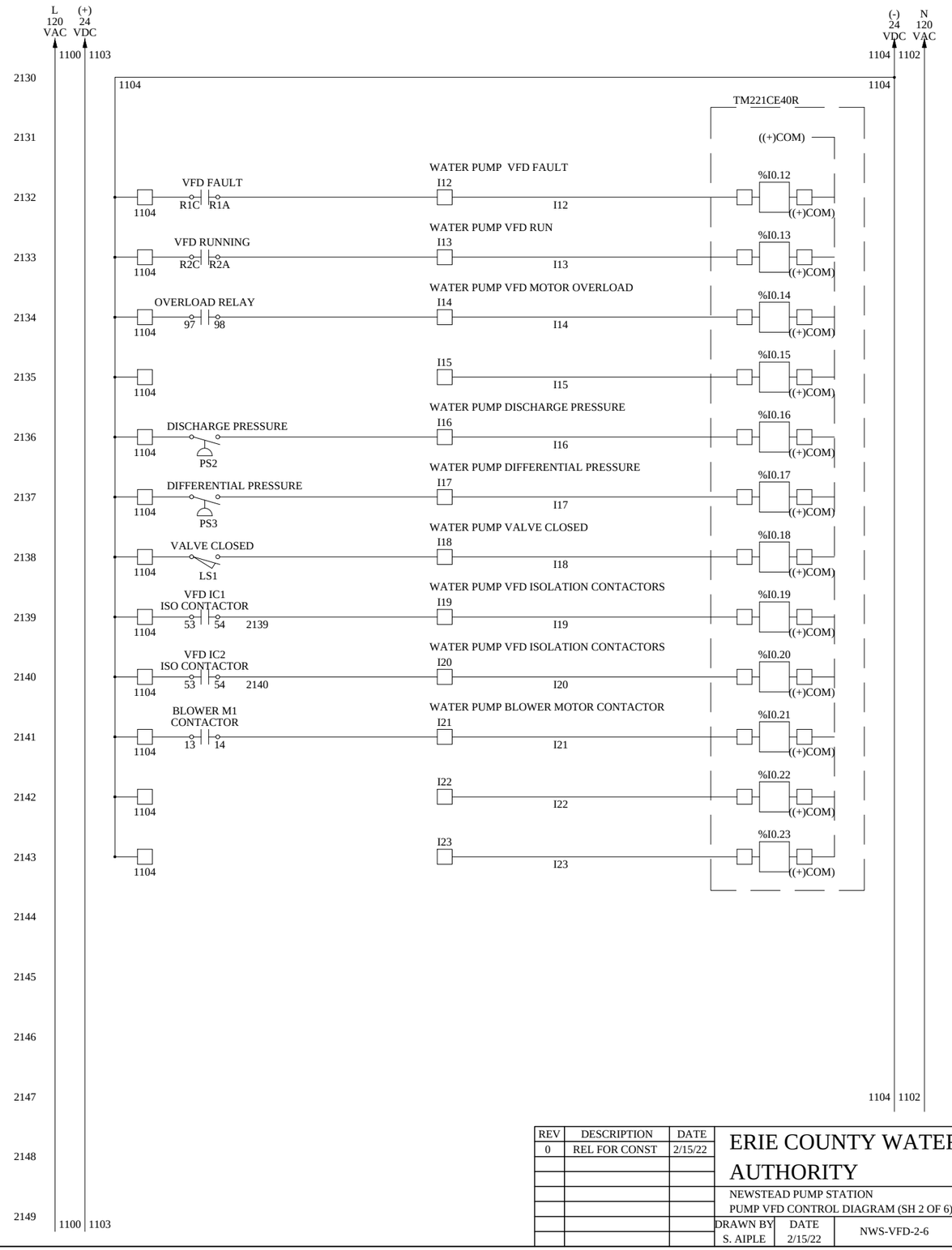
REV	DESCRIPTION	DATE
0	REL FOR CONST	2/15/22

ERIE COUNTY WATER AUTHORITY

NEWSTEAD PUMP STATION
PUMP VFD CONTROL DIAGRAM (SH 1 OF 6)

DRAWN BY	DATE		REV
S. AIPLE	2/15/22	NWS-VFD-1-6	00



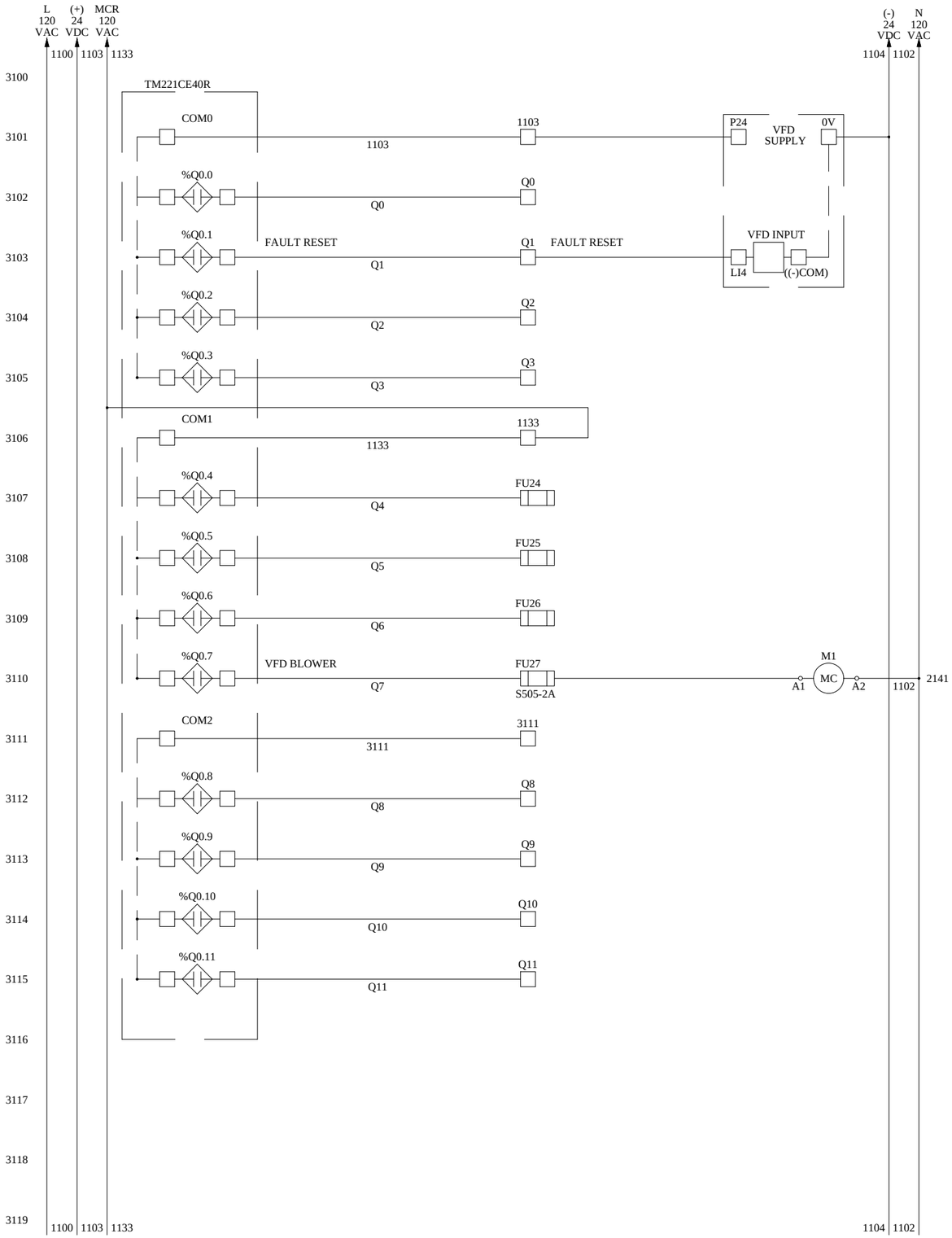


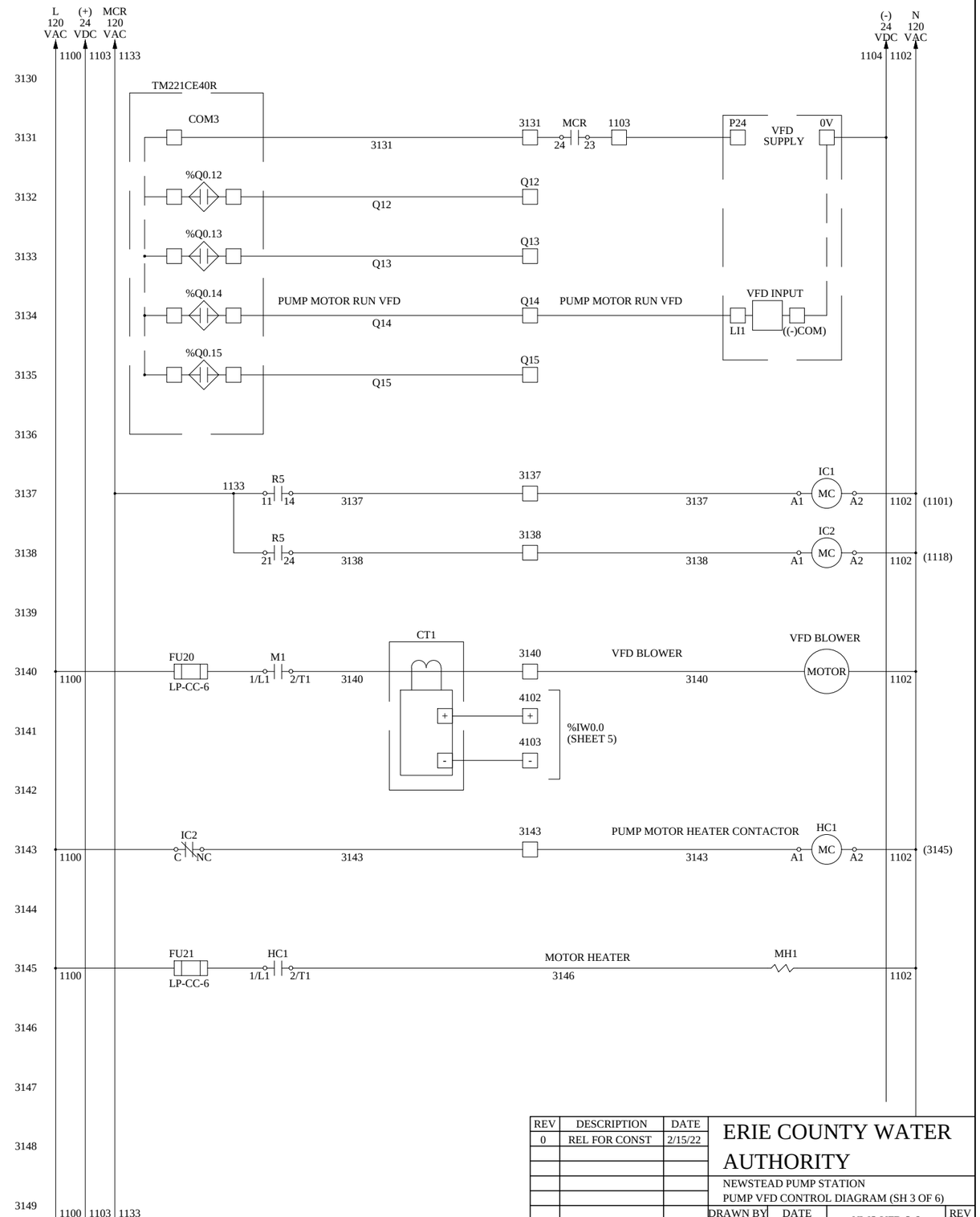
REV	DESCRIPTION	DATE
0	REL FOR CONST	2/15/22

ERIE COUNTY WATER AUTHORITY

NEWSTEAD PUMP STATION
PUMP VFD CONTROL DIAGRAM (SH 2 OF 6)

DRAWN BY	DATE		REV
S. AIPLE	2/15/22	NWS-VFD-2-6	00



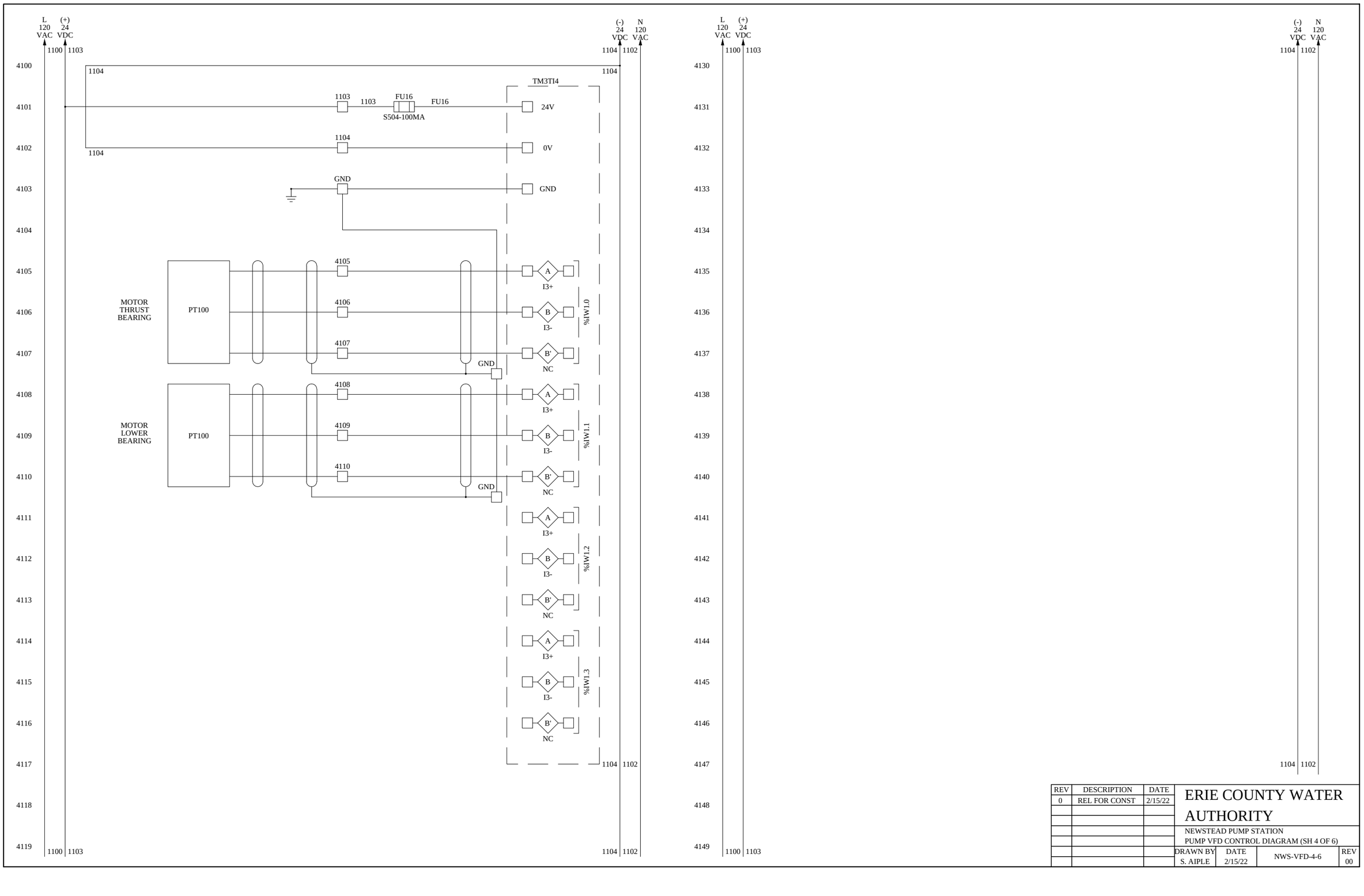


REV	DESCRIPTION	DATE
0	REL FOR CONST	2/15/22

ERIE COUNTY WATER AUTHORITY

NEWSTEAD PUMP STATION
PUMP VFD CONTROL DIAGRAM (SH 3 OF 6)

DRAWN BY	DATE		REV
S. AIPLE	2/15/22	NWS-VFD-3-6	00



REV	DESCRIPTION	DATE
0	REL FOR CONST	2/15/22

ERIE COUNTY WATER AUTHORITY

NEWSTEAD PUMP STATION

PUMP VFD CONTROL DIAGRAM (SH 4 OF 6)

DRAWN BY	DATE		REV
S. AIPLE	2/15/22	NWS-VFD-4-6	00

L 120 VAC
(+) 24 VDC
1100
1103
(-) 24 VDC
N 120 VAC
1104
1102

5100
5101
5102
5103
5104
5105
5106
5107
5108
5109
5110
5111
5112
5113
5114
5115
5116
5117
5118
5119

5130
5131
5132
5133
5134
5135
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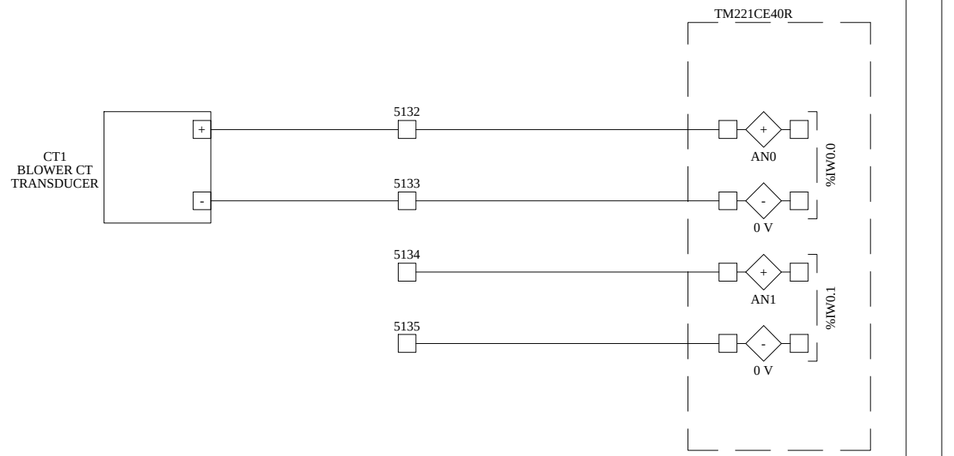
5148
5149



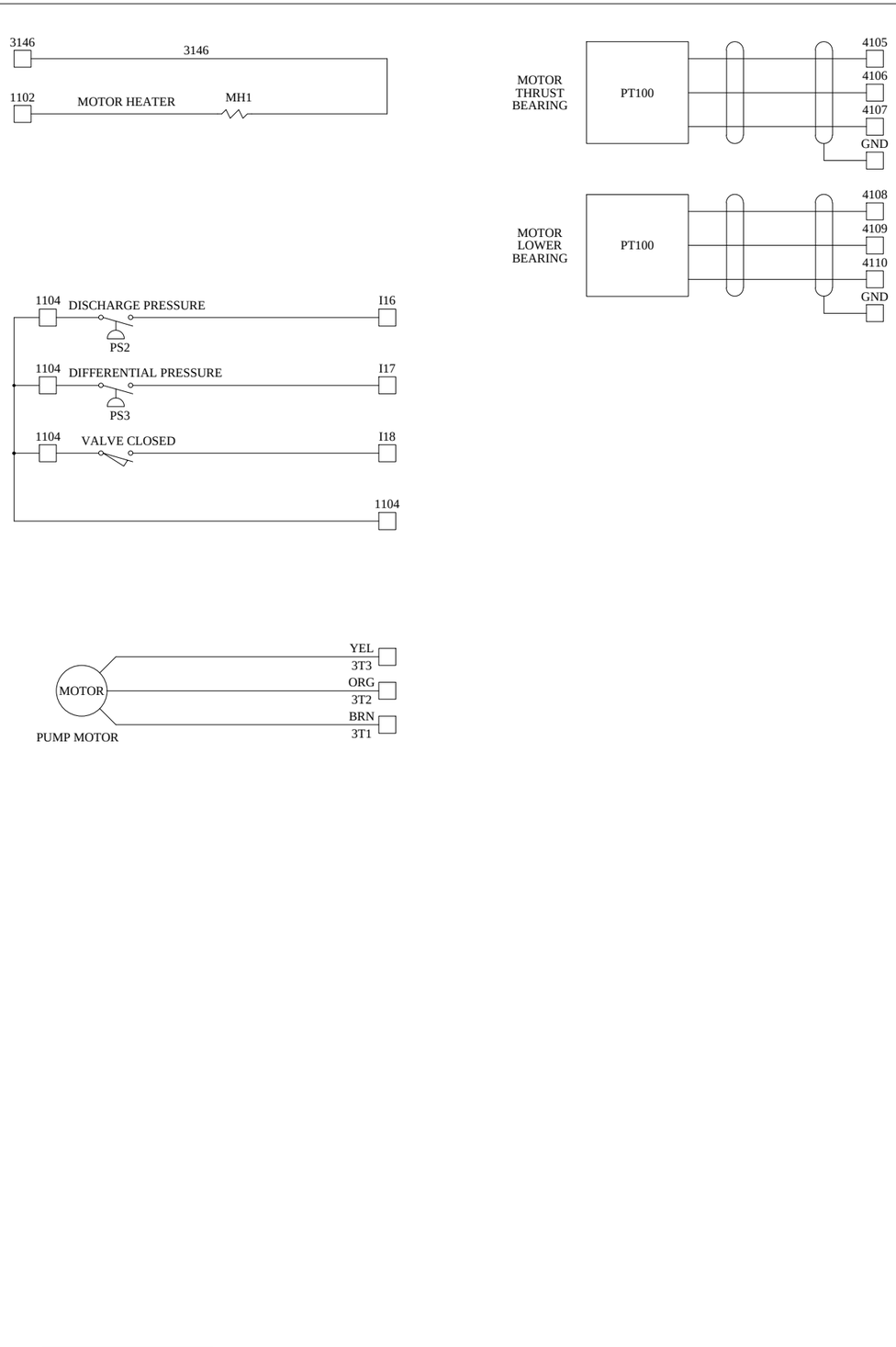
REV	DESCRIPTION	DATE
0	REL FOR CONST	2/15/22

ERIE COUNTY WATER AUTHORITY

NEWSTEAD PUMP STATION
PUMP VFD CONTROL DIAGRAM (SH 5 OF 6)

DRAWN BY	DATE		REV
S. AIPLE	2/15/22	NWS-VFD-5-6	00

PUMP MOTOR & VALVE FIELD TERMINATIONS



QUANTITY	U/M	MANUFACTURER	DESCRIPTION	PART NUMBER	DEVICE
1	EA	SCHNEIDER ELECTRIC	ALTIVAR 630 VFD - 200HP	ATV630C13N4	VFD
1	EA	SCHNEIDER ELECTRIC	VFD GRAPHIC KEYPAD	VW3A1111	VFD
1	EA	SCHNEIDER ELECTRIC	VFD GRAPHIC KEYPAD DOOR MOUNTING KIT	VW3A1112	VFD
1	EA	SCHNEIDER ELECTRIC	VFD GRAPHIC KEYPAD - 5 METER CABLE	VW3A1104R50	VFD
2	EA	SCHNEIDER ELECTRIC	CONTACTOR	LC1F265G7	IC1, IC2
1	EA	SCHNEIDER ELECTRIC	OVERLOAD RELAY (CLASS 20)	LR9F5571	MOL
1	EA	SCHNEIDER ELECTRIC	OVERLOAD RELAY MTG PLATE	LA7F901	MOL
2	EA	SCHNEIDER ELECTRIC	TERMINAL COVERS	LA9F703	IC1, IC2
2	EA	SCHNEIDER ELECTRIC	CONTACTOR COIL SUPRESSOR	LA9F980	IC1, IC2
2	EA	SCHNEIDER ELECTRIC	AUX 1NO-1NC CONTACTS	LADN11	IC1, IC2
1	EA	SCHNEIDER ELECTRIC	TERMINAL COVERS	LA9F705	MOL
1	EA	SCHNEIDER ELECTRIC	CONTROL RELAY	CAD50G7	MCR
2	EA	SCHNEIDER ELECTRIC	CONTACTOR	LC1D12G7	M1, HC1
2	EA	SCHNEIDER ELECTRIC	CONTACTOR COIL SUPRESSOR	LAD4RCU	M1, HC1
1	EA	SCHNEIDER ELECTRIC	E-STOP PUSH BUTTON	XB4BT842	E-STOP
1	EA	SCHNEIDER ELECTRIC	E-STOP PUSH BUTTON GUARD	ZB4BZ1905	E-STOP
1	EA	SCHNEIDER ELECTRIC	M211 40 I/O PLC	TM221CE40R	PLC
1	EA	SCHNEIDER ELECTRIC	4 CHANNEL TEMPERATURE INPUT MODULE	TM3TI4	PLC
1	EA	SCHNEIDER ELECTRIC	POWERPACT CIRCUIT BREAKER	LJL36250U31X	CB1
1	EA	SCHNEIDER ELECTRIC	CABLE DISCONNECT KIT - 60"	9422CSJ50	CB1
1	EA	SCHNEIDER ELECTRIC	DISCONNECT HANDLE MECHANISM	9422A1	CB1
1	EA	SCHNEIDER ELECTRIC	CONTROL TRANSFORMER	9070TF1500D1	CPT1
1	EA	SCHNEIDER ELECTRIC	FUSE PULLER KIT	9070FP1	CPT1
1	EA	SCHNEIDER ELECTRIC	FINGER SAFE KIT	9070FSC2	CPT1
1	EA	BUSSMAN	TYPE CC FUSE - 15A	LP-CC-15	FU3 (CPT1)
3	EA	BUSSMAN	TYPE CC FUSE - 6A	LP-CC-6	FU1, FU2, FU20, FU21
1	EA	BUSSMAN	5 X 20 TYPE T FUSE - 100MA	S504-100MA	FU16, FU17
1	EA	BUSSMAN	5 X 20 TYPE T FUSE - 250MA	S504-250MA	FU12
2	EA	BUSSMAN	5 X 20 TYPE T FUSE - 1A	S505-1A	FU13, FU14
6	EA	BUSSMAN	5 X 20 TYPE T FUSE - 2A	S505-2A	FU4, FU5, FU24, FU25, FU26, FU27
1	EA	BUSSMAN	5 X 20 TYPE T FUSE - 4A	S505-4A	FU10
2	EA	BUSSMAN	TYPE CC FUSE HOLDER	CHCC1DIU	FU20, FU21
1	EA	PHOENIX CONTACT	TVSS BASE	2907924	TVSS
1	EA	PHOENIX CONTACT	TVSS MODULE	2907922	TVSS
5	EA	PHOENIX CONTACT	24VDC 5 X 20 FUSE HOLDER UK5-HESILED24	3004126	FU10, FU12, FU13, FU14, FU16, FU17
6	EA	PHOENIX CONTACT	250VAC 5 X 20 FUSE HOLDER UK5-HESILA250	3004142	FU4, FU5, FU24, FU25, FU26, FU27
AS REQ.	EA	PHOENIX CONTACT	BLUE TERMINAL BLOCK - UT 4 BU	3044115	
AS REQ.	EA	PHOENIX CONTACT	GREY TERMINAL BLOCK - UT 4	3044102	
AS REQ.	EA	PHOENIX CONTACT	END COVER - D-UT 2,5/10	3047028	
AS REQ.	EA	PHOENIX CONTACT	BLUE DOUBLE HIGH TERMINAL BLOCK - UTTB 4 BU	3044791	
AS REQ.	EA	PHOENIX CONTACT	END COVER FOR DOUBLE HIGH TERMINAL - D-UTTB 2,5/4	3047293	
AS REQ.	EA	PHOENIX CONTACT	GROUND BLOCK - UT 4-PE	3044128	
AS REQ.	EA	PHOENIX CONTACT	END CLAMP - E/NS 35 N	0800886	
AS REQ.	EA	PHOENIX CONTACT	PLUG-IN BRIDGE - FBS10-6	3030271	
AS REQ.	EA	PHOENIX CONTACT	PLUG-IN BRIDGE - FBS20-6 BU	3032208	
AS REQ.	EA	PHOENIX CONTACT	INSERTION BRIDGE - EBS 10-8	3118135	
AS REQ.	EA	PHOENIX CONTACT	DIN RAIL - NS 35/15 PERF 1000MM	1207658	
1	EA	PHOENIX CONTACT	POWER SUPPLY 24VDC 4A	2938837	POWER SUPPLY
1	EA	PHOENIX CONTACT	ETHERNET SWITCH	2891002	ETHERNET SWITCH
1	EA	SCHNEIDER ELECTRIC	RELAY BASE - 3 POLE	RXZE2S111M	R5
1	EA	SCHNEIDER ELECTRIC	RELAY MODULE - 3 POLE - 24VDC COIL	RXM3AB2BD	R5
1	EA	HOFFMAN	DISCONNECT ENCLOSURE 90" X 40" X 24"	A90XM4024FTCG	ENCLOSURE
1	EA	HOFFMAN	ENCLOSURE PANEL (INCLUDED W/ ENCLOSURE)	N/A	ENCLOSURE
1	EA	HOFFMAN	DISCONNECT ADAPTER PLATE FOR SQUARE-D DISC.	A21SDA	ENCLOSURE
1	EA	WOODHEAD	ETHERNET BULKHEAD CONNECTOR	1300550001	ENCLOSURE
1	EA	WOODHEAD	ETHERNET BULKHEAD CONNECTOR COVER	1300580035	ENCLOSURE
1	EA	SCHNEIDER ELECTRIC	PROFACE HMI	PFXGP4301TADW	HMI
1	EA	KOOLTRONIC	BLOWER ASSEMBLY	KP4E315/101	BLOWER
2	EA	HOFFMAN	FILTER GRILLE PANEL - 10.5" x 19"	105G19	FILTER (NOTE 1)
2	EA	AMERICAN METAL	STAINLESS STEEL METAL AIR FILTER - 10" X 16.5" X 1"	"HIS" SERIES	FILTER (NOTE 1)
1	EA	EATON	CURRENT TRANSDUCER	EAC110SP	CT1
1	EA	TCI	LINE REACTOR	KDRG3H	LINE REACTOR (125HP)

NOTE 1: MODIFY HOFFMAN FILTER GRILLE PANEL (105G19) TO ACCEPT DEEPER AMERICAN METAL "HIS" FILTER

REV	DESCRIPTION	DATE
0	REL FOR CONST	2/15/22

ERIE COUNTY WATER AUTHORITY

NEWSTEAD PUMP STATION
PUMP VFD CONTROL DIAGRAM (SH 6 OF 6)

DRAWN BY	DATE		REV
S. AIPLE	2/15/22	VPK-VFD-6-6	00