

WEST MAIN PUMP STATION & FORCE MAIN

Contract Documents
&
Technical Specifications

CITY OF BEACON
DUTCHESS COUNTY, NEW YORK

COB Bid No. 2024-003
COB Contract No. 2024-xxx



Consulting Engineers
Lanc & Tully
Engineering and Surveying, P.C.
P.O. Box 687
Goshen, NY 10924

February, 2024

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ADVERTISEMENT FOR BIDS

West Main Pump Station and Force Main City of Beacon, Dutchess County, New York COB Bid No. 2024-003

Separate sealed bids will be received by the City of Beacon in City Hall at One Municipal Plaza, Beacon, New York, until 2:00 p.m. on March 21, 2024, and then at said office publicly opened and read aloud. Bids are requested for:

West Main Pump Station and Force Main City of Beacon, Dutchess County, New York

GENERAL CONTRACT

Scope of work includes the installation of a new sewage pump station with control building, wet well and generator on Metro-North property; along with the installation of approximately 2,900 linear feet of 12" sewer force main along City of Beacon owned roads.

Documents may be obtained via electronic means from: Proposals and Bid Notices – City of Beacon (beaconny.gov), Bidnet, and NYS Contract Reporter. Paper Copies of the Contract Documents and Plans may be obtained at Lanc & Tully Engineering and Surveying, P.C., 3132 Route 207, Campbell Hall, NY 10916. Phone (845) 294-3700, between the hours of 9:00 am and 3:30 pm, starting on February 22, 2024. Persons shall leave name, company name, correct mailing address, phone, fax and email address, along with a \$100.00 deposit for each set of documents and plans. The deposit shall be in the form of check or money order ONLY, for each set and shall be drawn payable to the City of Beacon. Addenda, if any, will be issued only to those persons whose name and address are on the record as having obtained the contract documents.

The City of Beacon reserves the right to waive what it deems to be informalities relating to a specific bid, to waive what it deems to be technical defects, irregularities and omissions relating to a specific bid, to reject any or all bids, to request additional information from any Bidder, to re-advertise for new bids or to accept the whole or part of any bid which in the opinion of the City Council of the City of Beacon is in the best interest of the City of Beacon. The City of Beacon will not discriminate against bidders because of race, creed, color, national origin, sex, age, disability or marital status. **Every worker employed in the performance of a public work contract shall be certified as having completed an OSHA 10 safety training course, in accordance with Labor Laws.**

Each bidder must deposit with their bid a bid security in the proper amount and form, as described and provided in the Information to Bidders and Non-Collusive Certificate.

INFORMATION FOR BIDDERS

1. RECEIPT AND OPENING OF BIDS

The City of Beacon, Dutchess County, New York (herein, called the "Owner") invites bids on the form attached hereto, all blanks of which must be appropriately filled in. Envelopes containing the bids must be sealed, addressed to: City of Beacon, City Hall, One Municipal Plaza, Beacon, New York 12508 and designated as **West Main Pump Station and Force Main** must be actually received not later than the time and the date specified in the Advertisement for Bids.

The Owner may consider informal any bid not prepared and submitted in accordance with the provisions thereof and may waive any informalities or reject any or all bids. Any bid may be withdrawn prior to the above scheduled time for the opening of bids. Any bid received after the time and date specified shall not be considered. No bidder may withdraw a bid within 45 days after the actual date of the opening thereof.

2. PREPARATION OF BID

Each bid must be submitted on the prescribed form. All blank spaces for bid prices must be completed in ink or by typewriter. In addition to the prescribed for, each bid must be accompanied by the following:

1. Required Bid Security
2. Information Sheet
3. Conflict of Interest Statement
4. Reference Sheet
5. Non-Collusive Bidding Certificate
6. Certification of Limited Foreign Involvement
7. Sexual Harassment Prevention Policy Certification
8. Iran Divestment Act Compliance Certification

Each envelope containing a bid must bear on the outside the name and address of the bidder, and the name of the project for which the bid is submitted and **COB Bid No. 2024-003**. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed as specified above. The Contractor assumes the risk of any error or delay in the delivery of its bid by whatever delivery means it chooses (e.g. mail, hand delivery, courier, overnight service or other means) including the handling of mail by employees of the City of Beacon.

The Contractor shall not include in the bid any sales and compensating use taxes of the State of New York or of any City or County in the State of New York for any materials which are to be incorporated in the work.

The City has a tax exemption number and forms which will be made available to the successful bidder to the extent permitted under the present applicable statutes.

No bids will be accepted unless the Non-Collusive Bidding Certificate provided in these specifications is properly executed and submitted with the bid, as required by the General Municipal Law.

3. BID MODIFICATION AND WITHDRAWAL

Any bidder may modify or withdraw its bid by telegraphic or written communication at any time prior to the opening of bids, provided such communication is received by the Owner prior to the opening, and provided further, the Owner is satisfied that a written confirmation of the telegraphic modification over the signature of the bidder was mailed prior to the opening time. The communication should not reveal the bid price but should provide the addition or subtraction or other modification so that the final prices or terms will not be known by the Owner until the sealed bid is opened. If written confirmation is not received within two days from the opening of bids time, no consideration will be given to the telegraphic modification.

4. METHOD OF BIDDING

A. The bid is unit price per item.

B. Lowest Bidder

Bids will be compared on the basis of the correct totals of the schedule of quantities comprising all items at the unit and lump sum prices bid for these items. The lowest bidder under each Contract will be that Bidder whose Bid totals the lowest number of dollars as determined above.

Owner reserves the right to reject any and all Bids, to waive any and all informalities not involving price, time or changes in the Work and to negotiate contract terms with the Successful Bidder, and the right to disregard all nonconforming, non-responsive, unbalanced or conditional Bids. Also, Owner reserves the right to reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder, whether because the Bid is not responsive, or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by Owner. Discrepancies in the Multiplication of units of Work and unit prices will be resolved in favor of the Unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

When numbered Alternate Bid items are required, the lowest Bidder is the Bidder whose Bid for the Alternate or combination of Alternates, selected by Owner, is the lowest. It shall be understood that the Owner reserves the right to select any alternate or combination of Alternates.

The alternate Bid Items are provided because of the City of Beacon's budgetary constraints and to achieve the economy of scale.

5. BID SECURITY

Each bid must be accompanied by cash, certified check of the bidder or a bid bond prepared on the Bid Bond Form attached, duly executed by the bidder as principal and having as surety thereon a surety company approved by the Owner, **licensed in the state of New York with a minimum rating of "bbb"**, in the amount of 5% of the total contract bid. Such cash, checks or bid bonds will be returned to all except the three lowest bidders within three days after the opening of bids, and the remaining cash, checks, or bid bonds will be returned promptly after the Owner and accepted bidder have executed the contract, or, if no award has been made within 45 days after the date of the opening of bids, upon demand of the bidder at anytime thereafter, as long as he has not been notified of the acceptance of his bid. Bid Security shall be made payable to the City of Beacon.

6. LIQUIDATED DAMAGES FOR FAILURE TO ENTER INTO CONTRACT

The successful bidder, upon his failure or refusal to execute and deliver the contract and bonds required within 15 days after he has received notice of the acceptance of his bid, shall forfeit to the Owner the security deposited with this bid, which sum is agreed on as the proper measure of liquidated damages that the Owner will sustain as a result of the failure or refusal to execute and deliver the contract and bonds as required in this paragraph. This sum is not to be construed in any sense as a penalty but as a good faith measure of the economic injury to the Owner which otherwise is impractical to calculate.

7. ADDENDA AND INTERPRETATIONS

No interpretations of the meaning of the plans, specifications or other pre-bid documents will be made to any bidder orally. Every request for such interpretation should be in writing addressed to Lanc & Tully, P.C., P.O. Box 687, Goshen, N.Y., 10924 and to be given consideration must be received at least five working days prior to the date fixed for the opening of bids. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the specifications which, if issued, will be mailed by Certified Mail with return receipt requested or by facsimile to all prospective bidders (at the respective address or facsimile number furnished for such purposes) not later than three working days prior to the date fixed for the opening of bids. Failure of any bidder to receive any such addendum or interpretation shall not relieve such bidder from any obligation under his bid as submitted. All addenda so issued shall become part of the contract documents.

8. SECURITY FOR FAITHFUL PERFORMANCE

Simultaneously with his delivery of the executed contract, the Contractor shall furnish a Construction Performance Bond and a Construction Payment Bond in amounts equal to 100% of contract price, as security for faithful performance of this contract and for the payment of all persons performing labor on the project under this contract and furnishing materials in connection with this contract, as specified in the General Conditions included herein. **Each bond shall state "The amount of the bond shall be adjusted to reflect the effect of any changes ordered by the owner by a Written Amendment, a Change Order, or a Work Change Directive".** The surety on such bond or bonds shall be a duly authorized surety company satisfactory to the Owner, **licensed in the state of New York with a minimum rating of "bbb"**, and shall be prepared on the forms found in these contract documents.

9. WARRANTY AND GUARANTEE

The Contractor shall warrant and guarantee all his work and material for a period of two years after final acceptance by the Owner in accordance with the General Conditions. The Owner shall retain 5% of the total completed works cost during this **two-year** period unless the Contractor provides an acceptable Maintenance Bond in the same amount, or unless his Performance Bond covers this two-year period.

10. OBLIGATION OF BIDDER

At the time of the opening of bids, each bidder will be presumed to have inspected the Technical Specifications and to have read and to be thoroughly familiar with the contract documents. The failure or omission of any bidder to examine any form, instrument or document shall in no way relieve any bidder from any obligation in respect to his bid. The lowest bidder shall supply the names and addresses of major material suppliers and subcontractors when requested to do so by the Owner.

11. QUALIFICATIONS OF BIDDER

The Owner may make such investigations as he deems necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the Owner that such bidder is properly qualified to carry out the obligations of the contract. Conditional bids will not be accepted.

12. POWER OF ATTORNEY

Attorneys-in-fact who sign Bid Bonds or Payment Bonds and Performance Bonds must file with each Bond a certified and effective dated copy of their power of attorney.

13. TIME OF COMPLETION AND LIQUIDATED DAMAGES

Bidder must agree to complete all work, no later than 240 calendar days after the date specified in the Notice to Proceed.

Bidder must agree to pay in accordance with the following schedule for each consecutive calendar day the project completion extends past the completion date, which sum is agreed on as the proper measure of liquidated damages that the Owner will sustain per diem by the failure of the Bidder to complete the work in the time stipulated, and this sum is not to be construed in any sense as a penalty but a good faith measure of the economic injury to the Owner which is otherwise impractical to calculate.

Original Contract Amount		Liquidated Damages Per Day
From More Than	To and Including	
\$0	\$25,000	\$575
\$25,000	\$50,000	\$600
\$50,000	\$100,00	\$725
\$100,000	\$500,000	\$825
\$500,000	\$2,000,000	\$1,025

14. LAWS AND REGULATIONS

The bidder's attention is directed to the fact that all applicable State laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over the project shall apply to the contract throughout, and they will be deemed to be included in the contract the same as though herein written in full.

15. ADDITIONS AND DELETIONS

The Owner may elect to delete from the contract any portion of the work or material described. Any major alterations, either subtractions or additions, will be made prior to the contract award.

16. INSURANCE

City of Beacon Requirements:

During the life of the contract, the Contractor shall maintain in full force and effect the following.

1. Workers Compensation Insurance and New York State Disability Insurance in conformity with the applicable laws of the State of New York.
2. Contractor's Comprehensive General Liability and Property Damage Insurance.
3. Contractor's Protective Comprehensive General Liability and Property Damage Insurance in his own name and for Sub-contractor operations.
4. Contractor's Protective Comprehensive General Liability and Property Damage Liability Insurance in the name of the Owner.
5. Bodily Injury Liability and Property Damage Liability Insurance for all automotive equipment utilized for this contract.
6. Umbrella/Excess Liability to provide insurance in excess of Employer's Liability, Commercial General Liability, and Automobile Liability policies.

The Contractor shall furnish to OWNER Certificates of Insurance as evidence of coverage prior to commencement of the PROJECT and naming the OWNER and ENGINEERS as Additional Insured on a primary and non-contributory basis. Waiver of Subrogation in favor of the OWNER is to be included. The Contractor shall provide thirty (30) days written notice to the OWNER, by registered mail with return receipt requested, prior to cancellation or expiration of the policy. Policies that lapse and/or expire during term of work shall be recertified and received by the OWNER no less than thirty (30) days prior to expiration or cancellation. All carriers listed in the certificates of insurance shall be A.M. Best Rated A VII or better and be licensed in the State of New York.

Metro-North Railroad Requirements:

The Contractor shall also furnish to METRO-NORTH RAILROAD Certificates of Insurance as evidence of coverage prior to commencement of the PROJECT, on the required Acord forms in conformance with the following requirements, and as outlined in Schedule "C" (Pages 20 through 33) of the Easement Agreement located in the Appendix. Sample Forms and Guidelines for Certificates of Insurance for Metro-North can be found in the Appendix. Specifics of the required insurance for Metro-North are as stated below:

Except that as otherwise provided in this Article and/or the Specifications, the Permittee and/or their Contractor shall procure, at its sole cost and expense, and shall maintain in force at all times during the term of this Agreement, through the FINAL COMPLETION of contract, policies of insurance as herein below set forth, written by companies with an A.M. Best Company rating of A-/“VII” or better, and approved by Metro-North Railroad/MTA and shall deliver evidence of such policies. These policies must: (i) be written in accordance with the requirements of the paragraphs below, as applicable; (ii) be endorsed in form

acceptable to include a provision that the policy will not be canceled, materially changed, or not renewed, unless at least thirty (30) days prior written notice to Metro-North Railroad/MTA c/o MTA Risk and Insurance Management Department - Standards, Enforcement & Claims Unit, 2 Broadway – 21st floor, New York, NY 10004 and (iii) state or be endorsed to provide that the coverage afforded under the Permittee and/or their Contractor's policies shall apply on a primary and not on an excess or contributing basis with any policies which may be available to Metro-North Railroad/MTA, and also that the Permittee and/or their Contractor's policies, primary and excess, must be exhausted before implicating any Metro-North Railroad/MTA policy available. (iv) In addition, the Permittee's and/or their Contractor's policies shall state or be endorsed to provide that, if a subcontractor's policy contains any provision that may adversely affect whether the Permittee's and/or their Contractor's policies are primary and must be exhausted before implicating any Metro-North Railroad/MTA policy available, the Permittee's and/or their Contractor's and subcontractor's policies shall nevertheless be primary and must be exhausted before implicating any Metro-North Railroad/MTA policy available. At least two (2) weeks prior to the expiration of the policies, the Permittee and/or their Contractor shall endeavor to provide evidence of renewal or replacement policies of insurance, with terms and limits no less favorable than the expiring policies. Except as otherwise indicated in the detailed coverage paragraphs below, self-insured retentions and policy deductibles shall not exceed \$100,000.00, unless such increased deductible or retention is approved by Metro-North Railroad/MTA. The Permittee and/or their Contractor shall be responsible for all claim expense and loss payments within the deductible or self-insured retention on the same basis as would be the case if commercial insurance was available for the loss. The insurance monetary limits required herein may be met through the combined use of the insured's primary and umbrella/excess policies.

- A. **Workers' Compensation Insurance** (including Employer's Liability Insurance with limits of not less than \$2,000,000, which limit may be met by a combination of primary and excess insurance) meeting the statutory limits of the laws of the state in which the work is to be performed.
- B. **Commercial General Liability Insurance** (I.S.O. CG 00 01 04 13 Form or equivalent approved by Metro-North Railroad) in the Permittee's and/or their Contractor's name with limits of liability in the amount of at least \$3,000,000 each occurrence/\$3,000,000 General Aggregate Limit (other than products-completed operations)/\$3,000,000 Products/Completed Operations Aggregate Limit on a combined single limit basis for injuries to persons (including death) and damage to property. The limits may be provided in the form of a primary policy or combination of primary and umbrella/excess policy. When the minimum contract amounts can only be met when applying the umbrella/excess policy, the umbrella/excess policy must follow form of the underlying policy and be extended to "drop down" to become primary in the event primary limits are reduced or aggregate limits are exhausted. Such insurance shall be primary and non-contributory to any other valid and collectible insurance and must be exhausted before implicating any Metro-North Railroad/MTA policy available.

Such policy should be written on an occurrence form, and shall include:

- Contractual coverage for liability assumed by the Permittee and/or their Contractor under this agreement;
- Personal and Advertising Injury Coverage;
- Products-Completed Operations;
- Independent Contractors Coverage;
- "XCU" coverage (Explosion, Collapse, and Underground Hazards) where necessary;

- Contractual Liability Exclusion, applicable to construction or demolition operations to be performed within 50 feet of railroad tracks, must be voided, where necessary;
- Coverage for claims for bodily injury asserted by an employee of an additional insured and any Employer Liability Exclusion which may otherwise operate to exclude such coverage shall be voided in this respect; and
- Additional Insured Endorsement (I.S.O. Form CG 20 26 07 04, CG 20 26 04 13 or CG 20 26 12 19 version or equivalent approved by Metro-North Railroad) listing:
 - Metro-North Railroad (MNRR), Metropolitan Transportation Authority (MTA), Midtown Trackage Ventures LLC, State of Connecticut and Connecticut Department of Transportation (CDOT), National Railroad Passenger Corp (AMTRAK), CSX Transportation, Inc. & New York Central Lines, LLC, and Delaware & Hudson Railway Company Inc. (D&H) and the respective affiliates and subsidiaries existing currently or in the future of and successors to each Indemnified Parties listed herein.

C. **Business Automobile Liability Insurance** - (I.S.O. Form CA 00 01 10 13 or equivalent approved by the Railroad). **If vehicle enters Agency's property or is used as part of service provided**, in the Permittee's and/or their Contractor's name with limits of liability in the amount of \$2,000,000 each accident for claims for bodily injuries (including death) to persons and for damage to property arising out of the ownership, maintenance or use of any owned, hired or non-owned motor vehicle. The policy shall be extended to include employees of any insured acting in the scope of their employment.

1. Initial Evidence of Insurance: The Permittee and/or their Contractor shall furnish evidence of all policies before any work is started to Metro-North Railroad as follows:

Metro-North Railroad
Operating Capital Department
420 Lexington Avenue, Tenth Floor
New York, NY 10170
Attention: R Webster
Email: rwebster@mnrr.org

2. **Renewal Insurance**: After the Contractor's insurance has been approved, a "compliant message" verifying insurance compliance will be sent to the Contractor via the MTA Certificate of Insurance Management System (CIMS), Complianz™. It will also provide the email address for all insurance renewals, specific to this contract. Do not bundle certificates as each contract is assigned a specific email address.

Certificates of Insurance may be supplied as evidence of the policies described above, unless otherwise noted herein. However, Metro-North Railroad reserves the right to request copies of such policies herein described above. If requested by Metro North, the Contractor shall deliver to Metro-North within forty-five (45) days of the request a copy of such policies, certified by the insurance carrier as being true and complete. If requested by Metro-North Railroad, the Permittee and/or their Contractor shall deliver to Metro-North Railroad, within forty-five (45) days of the request, a copy of such policies, certified by the insurance carrier as being true and complete. If a Certificate of Insurance is submitted, it must: (1) be provided on an **ACORD** Certificate of Insurance Form; (2) disclose any deductible, sublimit, self-insured retention,

aggregate limit or any exclusions to the policy that materially change the coverage; (3) indicate the Additional Insureds and Named Insureds as required herein. The Permittee and/or their Contractor must provide a physical copy of the Additional Insured Endorsement (I.S.O. Form CG 20 26 07 04, CG 20 26 04 13 or CG 20 26 12 19 version or equivalent, as applicable) and the endorsement(s) must include the appropriate policy number; (4) reference the Permit by number on the face of the certificate; and (5) expressly reference the inclusion of all required endorsements.

E. No Limit on Contractor's Liability: Nothing herein contained shall be deemed to limit the Permittee and/or their Contractor liability to the limits of liability, or coverage of the Policies above their renewals, or replacement.

F. Notice of Occurrence: The Contractor shall immediately file with the MNR's Legal Department, 420 Lexington Avenue, 11th Floor, New York, NY 10170, a notice of any occurrence likely to result in a claim against the MNR, and shall also file with the Legal Department detailed sworn proof of interest and loss with the claim. This paragraph shall survive the expiration or earlier termination of the Permit or License Agreement.

G. Insurance Not in Effect: If, at any time during the period of this Agreement, insurance as required is not in effect, or proof thereof is not provided to Metro-North Railroad, Metro-North Railroad shall have the options to: (i) direct the Permittee and/or their Contractor to suspend work or operation with no additional cost or extension of time due on account thereof; or (ii) treat such failure as an Event of Default.

DATE: _____

BID NAME: _____

INFORMATION SHEET

NAME OF BIDDER: _____

ADDRESS: _____

TYPE OF ENTITY: Corp _____ Partnership _____ Individual _____

If a non-publicly owned Corporation:

NAME OF CORPORATION: _____

List Principal Stockholders, holding over 5% of outstanding shares:

LIST OFFICERS: _____

LIST DIRECTORS: _____

DATE OF ORGANIZATION: _____

If partnership:

PARTNERS: _____

NAME OF PARTNERSHIP: _____

DATE OF ORGANIZATION: _____

****If the business is conducted under an assumed name, a copy of the Certificate required to be filed under the New York General Business Law must be attached.****

**CITY OF BEACON
CONFLICT OF INTEREST STATEMENT
COB Bid No. 2024-003**

VENDOR'S NAME: _____

SIGNATURE REQUIRED: _____

Print Name

DATE: _____

If the bidder is an individual, the bid must be signed by that individual; if the bidder is a corporation, by an officer of the corporation, or other person authorized by resolution of the Board of Directors, and in such case a copy of the resolution must be attached; if a partnership, by one of the partners or other person authorized by a writing signed by at least one general partner and submitted with the bid or previously filed with the Purchasing Agent.

"The submission of this constitutes a certification that no City Officer has any interest therein. (Note: In the event that any City Official has any such interest, the full nature thereof should be disclosed below.)"

REFERENCE SHEET

All bidders will be required to complete this form providing three references of past performance. References should involve projects and/or service situations of similar size and scope to this bid. References must have had dealings with the bidder within the last 12 months. The City reserves the right to contact any or all of the references supplied for an evaluation of past performance in order to establish the responsibility of the bidder before the actual award of the bid and/or contract. Completion of the reference form is required.

If references have been filed with the City of Beacon Purchasing Department during the last 12 months, it will not be necessary to complete this form. Indicate filing date on the line provided.

BIDDER'S NAME: _____

DATE FILED: _____

Bidder's Name: _____

Reference's Name: _____

Address: _____

Telephone: _____ Contact Person: _____

Bidder's Name: _____

Reference's Name: _____

Address: _____

Telephone: _____ Contact Person: _____

Bidder's Name: _____

Reference's Name: _____

Address: _____

Telephone: _____ Contact Person: _____

**BIDDER'S CERTIFICATION OF
LIMITED FOREIGN INVOLVEMENT**

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

SUBMITTED TO:

SUBMITTED FOR:

SUBMITTED BY:

Name: _____
(print or type name of bidder)

A Corporation / A Partnership / An Individual / A Joint Venture

Address: _____

Gentlemen:

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

1. The Offeror is not a contractor of a foreign country included on the list of countries that discriminate against U.S. firms as published by the U.S. Trade Representative (USTR).
2. The Offeror has not or will not enter into any subcontract with a subcontractor or a foreign country included on the USTR list.
3. The Offeror will not provide any product of a country included on the USTR list.

(print or type name of bidder)

(Seal, if Corporation)

By: _____

Title: _____

**BIDDER'S CERTIFICATION OF COMPLIANCE WITH NEW YORK STATE DEPARTMENT OF LABOR
SEXUAL HARASSMENT PREVENTION POLICY**

Pursuant to New York State Labor Law §201-g, every employer shall adopt a model sexual harassment prevention policy promulgated pursuant to this subdivision or establish a sexual harassment prevention policy to prevent sexual harassment that equals or exceeds the minimum standards provided by such model sexual harassment prevention policy.

Pursuant to New York State Finance Law §139-1, every bid hereafter made to the state or any public department or agency thereof, where competitive bidding is required by statute, rule or regulation, 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 penalty of perjury:

BIDDER'S CERTIFICATION

By submission of this bid, _____

(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 the bidder has and has implemented a written policy addressing sexual harassment prevention in the workplace and provides annual sexual harassment prevention training to all of its employees. Such policy shall, at a minimum, meet the requirements of §201-g of the Labor law."

_____ further represents that it has adopted a sexual harassment prevention policy ('policy') and that it provides annual sexual harassment prevention training to its employees as required by and consistent with the regulations promulgated by the New York State Department of Labor. _____ agrees to provide a copy of the policy to _____ upon request.

SIGNATURE

PRINTED NAME

TITLE

Sworn to before me this ____ day of _____, 20 ____

Notary Public

BIDDER'S CERTIFICATION OF COMPLIANCE WITH IRAN DIVESTMENT ACT

Pursuant to General Municipal Law §103-g, which generally prohibits the City of Beacon from entering into contracts with persons engaged in investment activities in the energy sector of Iran, the bidder/proposer submits the following certification:

[Please Check One]

BIDDER'S CERTIFICATION

☐ By submission of this bid or proposal, each bidder/proposer and each person signing on behalf of any bidder/proposer certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief, that each bidder/proposer is not on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the State Finance Law.

☐ I am unable to certify that my name and the name of the bidder/proposer does not appear on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the State Finance Law. I have attached a signed statement setting forth in detail why I cannot so certify.

Dated: _____, _____, New York, 20 __

SIGNATURE

PRINTED NAME

TITLE

Sworn to before me this ____ day of _____, 20 __

Notary Public

**BID FORM
COB Bid No. 2024-003**

**West Main Pump Station and Force Main
City of Beacon, Dutchess County, New York**

This Bid is submitted to:

CITY OF BEACON CITY HALL
ONE MUNICIPAL PLAZA
BEACON, NEW YORK 12508

By: _____
(Name of Contractor)

1. The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into an agreement with OWNER in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents and Technical Specifications for the Contract Price and within the Contract Time indicated in the accordance with the other terms and conditions of the Contract Documents. The terms and conditions of the Contract Documents shall become enforceable upon the adoption of a Resolution by the City Council to award the Contract to the selected BIDDER.
2. BIDDER accepts all of the terms and conditions of the Advertisement for Bids and Information for Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for the specified number of calendar days after the day of Bid opening as stated in the Information for Bidders. BIDDER will sign and submit the Agreement with the Bonds and other documents required by the Bidding Requirements also as specified in the Information for Bidders.
3. In submitting this Bid, BIDDER represents, as more fully set forth in the Agreement, that BIDDER has examined copies of all the Contract Documents, the Advertisement for Bids, the Information for Bidders, and of the following Addenda (receipt of all which is hereby acknowledged):

Date Received

Addendum Number

4. BIDDER has familiarized itself with the nature and extent of the Contract Documents, technical specifications, work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance or furnishing of the Work.

BID FORM - *continued*

5. BIDDER agrees that the Work will be complete in accordance with the Contract Documents within the number of calendar days indicated in the Agreement and accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work on time.
6. The following documents are attached to and made a Condition of this Bid:
- A. Required Bid Security in the form of: (check appropriately)
 - 1. 5% Bid Bond _____
 - 2. Certified Check _____
 - 3. Cash _____
 - B. Non-Collusion Bidding Certification
 - C. Information Sheet
 - D. Conflict of Interest Statement
 - E. Reference Sheet
 - F. Statement of Bidder's Qualifications
 - G. Certification of Limited Foreign Involvement
 - H. Sexual Harassment Prevention Policy Certification
 - I. Iran Divestment Act Compliance Certification
7. Communications concerning this Bid shall be addressed to the BIDDER at the following address:
- _____
- _____
- _____
8. The terms used in this Bid are defined and have the meanings assigned to them in the General Conditions.
9. The UNIT PRICES shall include all of the Contractor's Costs including but not limited to the cost of material, labor, delivery, installation, loading, unloading, overhead, profit, insurance, etc.
10. **The approximate quantities of work to be performed under the proposed contract are set forth in the Bid Form. These quantities are to be considered as approximate only and are given solely for the comparison of bids. The Owner does not expressly or by implication agree that the actual amount will correspond therewith, but reserves the right to increase or decrease the amount of any item or portion of the work as may be deemed necessary by the Engineer. The Contractor shall at no time make claim for anticipated profit or loss of profits because of any difference between the quantities of work actually done, or of material actually furnished, and the estimated quantities. The Contractor will be paid only for the actual quantities of work performed at the Contract Unit Price bid.**

**WEST MAIN PUMP STATION & FORCE MAIN
CITY OF BEACON, DUTCHESS COUNTY, NY**

All items are *complete items* & include furnishing, installation, excavation, backfilling, labor, etc., unless mentioned otherwise in this Bid Form.

BIDDER will complete the BASE BID work on **West Main Pump Station & Force Main** using the following unit prices:

Item #	Item Description	Unit	Est. Qty	Material Cost Only Per Unit	Total Price Per Unit (Material,Labor, Installation, etc.)	Total Amount
1	City of Beacon Bonds and Insurance	LS	1			
2	Metro-North Insurance, and all other requirements to be met by Metro-North	LS	1			
3	Construction of new sewage pump station, as shown on Sheets 2 of 24 through 19 of 24 of the plan set. This shall include all demolition, excavation, dewatering, disposal of wastes, grading, structures, wet well pumps, valve pit, valves, meters, piping, generator, control building, controllers, wiring of control building, wiring of generator to control building, electrical connection to utility system, fencing, gates, paved drive, water service line, gas service line, installation of gravity sewer line from existing pump station to new pump station, manhole structures and castings, by-pass pumping required for tie over connection, restoration of site, preparation of O&M manual, and all else incidental and necessary to provide for a complete and fully operational pump station in accordance with the plans and technical specifications. Contractor shall prepare a schedule of values for the project.	LS	1			

WEST MAIN PUMP STATION & FORCE MAIN
City of Beacon, Dutchess County, NY

Item #	Item Description	Unit	Est. Qty	Material Cost Only Per Unit	Total Price Per Unit (Material,Labor, Installation, etc.)	Total Amount
4	Excavation and disposal of contaminated soil material from sewage pump station site to NYSDEC approved disposal site	CY	45			
5	Test Pits along Force Main route	LS	1			
6	Traffic Control – Includes development of traffic control plans for work at and around pump station as well as along route for force main.	LS	1			
7	Removal and disposal of curbing. Includes saw cutting, excavation, and labor.	LF	100			
8	Remove, store, and re-install granite curbing. Includes saw cutting, excavation, disposal of wastes, bedding, concrete mix, and all else incidental and necessary to complete the work	LF	20			
9	Removal and disposal of sidewalk. Includes saw cutting, excavation, and labor.	LF	100			
10	Rock excavation	CY	25			
11	Installation of new concrete curbing.	LF	100			
12	Installation of new concrete sidewalk. Include sealing of expansion joint seams.	SF	425			
13	Installation of 6" thick concrete driveway apron at pump station.	SF	90			
14	Pavement removal along route of force main.	SY	1,440			

WEST MAIN PUMP STATION & FORCE MAIN
City of Beacon, Dutchess County, NY

Item #	Item Description	Unit	Est. Qty	Material Cost Only Per Unit	Total Price Per Unit (Material,Labor, Installation, etc.)	Total Amount
15	3" of temporary pavement along force main trench until final paving. Contractor shall maintain temporary pavement until such time as final pavement is installed.	SY	1,440			
16	Milling of trench line edges to allow for installation of 1 ½" final top course beyond actual trench line.	SY	2,370			
17	1 ½ " top course, Type 6FX for pavement restoration. Includes tack coat and sealing of seams.	SY	2,370			
18	3 " binder course, Type 3 for pavement restoration. Includes tack coat.	SY	1,440			
19	3" base course, Type 1 for pavement restoration.	SY	1,440			
20	Replacement of white traffic striping.	LF	165			
21	Replacement of yellow traffic striping.	LF	130			
22	Striping of turn arrow.	Each	1			
23	Grading, topsoil, seeding, and mulching of all disturbed areas.	LS	1			
24	Excavation of 24" trench for gas main, sand bedding for gas main, and backfilling of gas main once installed by Central Hudson. Contractor shall take into account working with Central Hudson for installation of gas main.	LF	320			

WEST MAIN PUMP STATION & FORCE MAIN
City of Beacon, Dutchess County, NY

Item #	Item Description	Unit	Est. Qty	Material Cost Only Per Unit	Total Price Per Unit (Material,Labor, Installation, etc.)	Total Amount
25	Installation of 12" C900 DR25 force main piping. Includes excavation, equipment labor, piping, backfilling, compaction, and disposal of all wastes.	LF	2,472			
26	12" ductile iron pipe at air release manhole. Includes excavation, equipment labor, piping, backfilling, compaction, and disposal of all wastes.	LF	20			
27	Installation of 18" SDR-35 PVC gravity sewer pipe. Includes excavation, equipment labor, piping, backfilling, compaction, and disposal of all wastes.	LF	13			
28	Installation of 4" SDR-35 PVC gravity sewer pipe at air release manhole. Includes excavation, equipment labor, piping, backfilling, compaction, and disposal of all wastes.	LF	102			
29	Installation of 12" 45-degree ductile iron bends.	Each	8			
30	Installation of 12" 22 1/2-degree ductile iron bends.	Each	1			
31	Installation of 12" 11 1/4-degree ductile iron bends.	Each	6			
32	Installation of restraints at fittings.	Each	32			

WEST MAIN PUMP STATION & FORCE MAIN
City of Beacon, Dutchess County, NY

Item #	Item Description	Unit	Est. Qty	Material Cost Only Per Unit	Total Price Per Unit (Material,Labor, Installation, etc.)	Total Amount
33	Installation of 12"x12"x4" ductile iron tee in air release manhole.	Each	1			
34	Installation of 4" plug valve.	Each	1			
35	Installation of 4" air release valve.	Each	1			
36	Installation of 5-foot diameter concrete manhole for air release chamber.	VLF	9			
37	Installation of 4-foot diameter concrete manholes	VLF	7.5			
38	Installation of domestically made manhole frame and cover.	Each	2			
39	Abandonment of manhole structure. Includes excavation, removal of upper portion of structure, filling of lower portion of structure, and disposal of all wastes	Each	2			
40	Removal of drainage piping. Includes excavation, backfilling, compaction, and disposal of all wastes	LF	25			
41	Removal of existing sanitary sewer piping where noted on plans. Includes excavation, backfilling with Select Material No. 4, compaction, and disposal of all wastes.	LF	80			
42	Fulling grouting closed sewer piping that is not slated for removal.	LS	1			

WEST MAIN PUMP STATION & FORCE MAIN
City of Beacon, Dutchess County, NY

Item #	Item Description	Unit	Est. Qty	Material Cost Only Per Unit	Total Price Per Unit (Material,Labor, Installation, etc.)	Total Amount
43	Repair of damaged water service. Includes excavation, equipment, labor, all required piping, materials and fittings for repair, and disposal of all wastes.	Each	5			
44	Repair of damaged sewer service. Includes excavation, equipment, labor, all required piping, materials and fittings for repair, and disposal of all wastes	Each	3			
45	Misc. concrete needed for thrust restraints.	CY	32			
46	Additional Select Material No. 4, as ordered by Engineer , installed and compacted.	CY	100			
47	Testing of force main.	LS	1			
48	Contract Allowance – To be included in the Total Base Bid.	LS	1		\$100,000.00	\$100,000.00
TOTAL (Base Bid)						

Total BASE BID (*in words*) Price for *West Main Pump Station & Force Main* (Item Nos. 1 - 48):

IF BIDDER is:

INDIVIDUAL

By _____

[Seal]

(Individual's Name)

doing business as _____

Business address: _____

Telephone #: _____

PARTNERSHIP

By _____

[Seal]

(Firm Name)

(General Partner)

doing business as _____

Business address: _____

Telephone #: _____

CORPORATION

By _____

[Corporate Seal]

(Corporation Name)

(State of Corporation)

By _____

(Name of Person Authorized to Sign)

(State of Corporation)

Attest: _____

(Secretary)

Business address: _____

Telephone #: _____

JOINT VENTURE

By _____

(Name)

(Address)

By _____

(Name)

(Address)

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

BID BOND**BIDDER** (Name and Address):

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

OWNER (Name and Address):

BID

BID DUE DATE: _____

PROJECT (Brief Description Including Location):

BOND

BOND NUMBER: _____

DATE: (Not later than Bid Due Date): _____

PENAL SUM: _____

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)
 Bidder's Name and Corporate Seal

 _____ (Seal)
 Surety's Name and Corporate Seal

 By: _____
 Signature and Title

 By: _____
 Signature and Title
 (Attach Power of Attorney)

 Attest: _____
 Signature and Title

 Attest: _____
 Signature and Title

-
- Note: (1) Above addresses are to be used for giving required notice.
 (2) Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable.

 EJCDC NO. 1910-28-C (1990 Edition)

1. 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. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents and Contract Documents.

3. This obligation shall be null and void if:

3.1. 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 and Contract Documents, or

3.2. All bids are rejected by Owner, or

3.3. 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 hereof).

4. Payment under this Bond will be due and payable upon default of 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. 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 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. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in paragraph 4 above is received by Bidder and Surety, and in no case later than one year after Bid Due Date.

7. 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. Notice 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. 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. 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 the Bond conflicts with any applicable provision of 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. The term "bid" as used herein includes a bid, offer or proposal as applicable.

NON-COLLUSIVE BIDDING CERTIFICATION

(General Municipal Law 103-d)

COB Bid No. 2024-003

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 knowledge and belief

1. The prices in this bid have been arrived at independently without collusion, consultation, communications, 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 a bid for the purposes of restricting competition.

The foregoing statement has been read and subscribed by the undersigned bidder and is hereby affirmed as true under the penalties of perjury.

[Seal]

Company Name

Name & Title

Signature

Address

City & State

Telephone Number/Facsimile Number

Federal ID Number

Date

GOODS AND SERVICES AGREEMENT

THIS AGREEMENT, made and executed this _____ day of _____, 2024 by and between the City of Beacon, a municipal corporation and city of the State of New York, with principal offices at 1 Municipal Plaza, Beacon, New York 12508 (the "City") and _____, with principal offices at _____ (the "Contractor").

WHEREAS, the City solicited bids for **West Main Pump Station and Force Main**; and

WHEREAS, the Contractor submitted a bid in response to the solicitation;

NOW THEREFORE, in consideration of the mutual promises and covenants contained in this Agreement, the parties agree as follows:

ARTICLE 1: SCOPE OF WORK

The Contractor shall perform all work and furnish all services, labor, material and equipment described in and required by the Request for Bids ("RFB") issued by the City, a copy of which is attached hereto as Attachment A. Project consists of the installation of a new sewage pump station, including wet well with pumps, valve chamber, control building and generator on Metro-North property, as well as the installation of approximately 2,900 linear feet of 12" sanitary force main along City of Beacon roads, the restoration of all disturbed areas, and all other work as outlined with the contract documents and plans. The Contractor shall perform all work and furnish all services, labor, material and equipment in accordance with the specifications and conditions included in and/or attached to the RFB, unless otherwise specifically stated in this Agreement. The Contractor must satisfy the performance requirements, if any, contained in the RFB and in the technical specifications attached to the RFB. The Contractor represents that it has the requisite knowledge and skills to perform all work and furnish all services, labor, material and equipment described in and required by the RFB (See Attachment A).

The Contractor must comply with the prevailing wage rates that are applicable to the labor and services to be provided. All wages and supplements paid to laborers performing any work pursuant to this Agreement shall be paid not less than the wages and supplements in the applicable New York State Department of Labor ("NYSDOL") Prevailing Wage Schedule for Dutchess County, specifically Prevailing Wage Schedule PRC# 2024002117. New York State Prevailing Wage Rates are subject to change annually on July 1st. The Contractor must comply with the wages and supplements posted by NYSDOL July 1st every year. If federal grant monies are funding any of the work to be performed or any of the services, labor, materials or equipment to be furnished, the Contractor also must comply with the Davis-Bacon Act, 40 U.S.C. § 3141 et seq., as supplemented by regulations of the U.S. Department of Labor, 29 CFR Part 5, which requires the Supplier to pay wages to laborers and mechanics at a rate not less than prevailing wages specified in a wage determination made by the U.S. Secretary of Labor. The Contractor must pay wages not less than once a week.

ARTICLE 2: TIME OF PERFORMANCE

The Contractor shall perform all work and furnish all services, labor, material and equipment described within the time stated in the RFB, unless otherwise stated herein, subject to any adjustments authorized through an amendment of this Agreement. Upon issuance of Notice to Proceed, Contractor shall have 240 calendar days to complete the scope of work.

Time is of the essence for all work, services, material and equipment to be performed pursuant to this Agreement as described in Article 1 herein and as described in the RFB (See Attachment A). The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

The Date of Final Completion is the date all of work, services, labor, material and equipment required under the Contract Documents is completed, all required materials, equipment and documents required by the Contract Documents have been delivered to the City (e.g., Record Drawings, O&M manuals, etc.), and all applicable licenses, permits, certificates, or approvals have been obtained for the City's beneficial use of the work, services, labor, material and equipment required under the Contract Documents.

As time is of the essence, the Contractor shall staff the project with two (2) crews, with one crew assigned to the construction of the sewage pump station and the second crew assigned to the installation of the force main, so that both portions of the project are constructed simultaneously.

ARTICLE 3: CONTRACT DOCUMENTS

The following documents form the Agreement, and all are as fully a part of the Agreement as if attached to this Agreement or repeated herein and shall be referred to herein as the "Contract Documents":

1. This Agreement.
2. Amendments to this Agreement that are mutually agreed upon by the parties.
3. The City's Request for Bid with all Addenda (Attachment A), including but not limited to any instructions for the bidders, bidding procedures and requirements, qualifications of bidders, specifications, technical specifications, drawings, conditions (general, supplementary and any other conditions) included therein and any Bid Addenda issued prior to the bid opening.
4. All other attachments to this Agreement.

In the event of any conflict among the provisions of the Contract Documents or between the Contract Documents and any applicable standard, code, statute, regulation or ordinance, those provisions most favorable to the City shall govern. In the event of any conflict among the provisions of the Contract Documents or between the Contract Documents and any applicable standard, code, statute, regulation or ordinance, the Contractor shall notify the City of same, comply with the more stringent requirement and comply with the City's interpretation. Where there is a conflict in quantity, unless otherwise directed by the City, the Contractor shall provide the greater quantity. Where there is a conflict in quality, unless otherwise directed by the City, the Contractor shall provide the superior quality.

This Agreement, including all of the Contract Documents, represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral, with respect to the subject of this Agreement.

ARTICLE 4: COMPENSATION

For the above-described Scope of Work (see Article 1), the City shall pay the Contractor pursuant to the unit prices set forth in Contractor's bid, a sum not to exceed \$_____, subject to any adjustment authorized through an amendment of this Agreement. This sum includes all costs, expenses, overhead and profit of the Contractor and no other compensation shall be due for the work performed, unless this sum is adjusted through an amendment of this Agreement.

Payment of any invoice or claim shall not preclude the City from making a claim for adjustment on any item found not to have been in accordance with the Contract Documents.

The Contractor shall submit invoices and payment requisitions by the 10th of each month for the percentage of the work performed and labor, materials and equipment furnished in the prior calendar month, which invoices must be supported by the following documentation:

- a. Invoice must reference purchase order number issued to the Contractor by City;
- b. Certified payroll(s); and
- e. Any other documentation required by the Contract Documents or requested by the City to confirm the work performed and labor, materials and equipment furnished.

Payment will be made after receipt of an invoice with all required supporting documentation in accordance with the terms of the RFB (Attachment A). If payment of invoices is not addressed in RFB, then replace prior sentence with: Payment will be made within thirty (30) days after receipt of an invoice with all required supporting documentation less five percent of the sum earned. The five percent retainage shall be paid in the final payment when all work has been performed and all services, labor, material and equipment furnished in accordance with the Contract Documents.

ARTICLE 5: AGREEMENT TERMINATION

The City may suspend or terminate this Agreement by providing the Contractor with ten (10) days written notice for the reasons outlined as follows:

1. Failure of the Contractor, for any reason, to fulfill in a timely and proper manner its obligations under this Agreement.
2. Violation of any of the provisions of this Agreement by the Contractor.
3. A determination by the City that the Contractor has engaged in fraud, waste, mismanagement, misuse of funds, or criminal activity with any funds provided by this Agreement.

The City may also terminate this Agreement at any time for convenience by providing the Contractor written notice specifying therein the termination date which shall be no sooner than thirty (30) days from the issuance of said notice.

Upon receipt of a notice of termination, the Contractor shall cease to incur additional expenses in connection with the Agreement. Upon termination of the Agreement for the City's convenience, the Contractor shall be entitled to compensation for all work performed and all

services, labor, material and equipment furnished prior to the termination date as reasonably determined by the City. Such payment shall not exceed the fair value of the services provided hereunder. Upon termination of the Agreement by the City for cause, the Contractor shall be entitled to compensation for all work performed and all services, labor, material and equipment furnished in accordance with the Contract Documents less any damages and/or expenses incurred by the City as a result of the Contractor's acts or omissions in the performance of this Agreement as reasonably determined by the City. Such payment shall not exceed the fair value of the services provided hereunder.

ARTICLE 6: INSPECTION

The City and Metro-North Railroad shall have the right to inspect the work performed by the Contractor and the services, materials and equipment furnished by the Contractor at all times, but such inspection shall not relieve the Contractor of responsibility for the proper performance of the Scope of Work (see Article 1).

ARTICLE 7: INDEMNIFICATION

To the maximum extent permitted by law, the Contractor shall indemnify, defend and hold harmless the City and Metro-North Railroad and its respective elected officials, officers, agents, and employees from and against any and all losses, damages, detriments, suits, claims, demands, liabilities, costs and charges, including reasonable attorneys' fees and disbursements that (1) arise directly or indirectly from or are in any way related to the performance under this Agreement, (2) to the extent they arise from any negligent act or omission of the Contractor and/or its contractors, employees, volunteers or subcontractors; or (3) result from any default of this Agreement or any provision hereof by the Contractor. The Contractor shall be solely responsible for all local taxes or contributions imposed or required under the Social Security, Workers' Compensation, and Income Tax laws. The terms of this Article 7 shall not be construed as a limitation of the Contractor's liability under the Agreement or as otherwise provided by law. The obligation of the Contractor to indemnify any party under this Article 7 shall not be limited in any manner by any limitation of the amount of insurance coverage or benefits including worker's compensation or other employee benefit acts provided by the Contractor.

If any action by the Contractor or its employees, consultants, contractors, or subcontractors results in damage to the real or personal property of the City, the Contractor shall repair or cause to be repaired such damage at its sole cost and expense.

The Contractor shall defend and hold the City and Metro-North Railroad harmless against any and all claims and suits based on a claim that the operation of any equipment furnished by the Contractor infringes on any U.S. patent under which the City is not licensed.

ARTICLE 8: APPLICABLE LAW

The Contractor, at its sole cost and expense, agrees to comply with all applicable local, state, and federal laws, statutes, ordinances, regulations, rules, requirements and orders relating to work to be performed and the services, labor, materials and equipment to be furnished pursuant to this Agreement and the Contract Documents. This Agreement shall be governed by and construed in accordance with the laws of the State of New York.

ARTICLE 9: ASSIGNMENT

The Contractor shall not make any assignment, transfer, conveyance, sublet or otherwise dispose of all or any part of its rights and obligations under this Agreement without the prior written consent of the City.

ARTICLE 10: AMENDMENTS

All amendments or any changes to the provisions specified in this Agreement can only occur when mutually agreed upon by the City and the Contractor. Further, such amendments or changes shall be in writing and signed by officials with the authority to bind the City. Additionally, all amendments and changes shall be approved by the City prior to execution. No amendment or change to the Agreement provisions shall be made until after the written execution of the amendment or change to the Agreement by both parties.

ARTICLE 11: INSURANCE AND BONDS

The Contractor shall be responsible to the City, Metro-North Railroad, or any third party for any property damage or bodily injury caused by it, any of its subcontractors, employees, or agents in the performance of, or as a result of, the performance of this Agreement. The Contractor hereby certifies that the Contractor and any subcontractors retained or to be retained, with the consent of the City, by the Contractor have and shall maintain the types and amounts of insurance set forth in this Article 11 and such insurance complies with the terms and conditions set forth in this Article 11, as well as complying with the insurance requirement for Metro-North Railroad as set forth in the "Information for Bidders" and "Easement Agreement" found in the Appendix.

A. Insurance Requirements.

1. No work shall commence and the City has the option to void this Agreement unless the Contractor, at its sole cost and expense, shall secure and deliver a certificate(s) of insurance dated within five (5) days of the date of the signing of this Agreement and showing that the required insurance coverage is in effect and has been obtained from an insurer that is admitted and licensed to issue insurance and to do business in New York State. The Contractor shall maintain such insurance coverage as will protect itself, its subcontractors, and unless otherwise specified, the City, its agents, servants and employees and the Project Architect and/or Engineer(s) as additional named insureds, from any all claims for Bodily Injuries, Death or Property Damage which may arise from operations under this Agreement whether such operations be by the Contractor or by any subcontractor or anyone employed by the Contractor directly or indirectly, or any other party who may be injured, claim injuries or die.
2. The Contractor shall furnish original, signed/notarized Certificates of Insurance in duplicate, with the project name and number (if any) stated on the certificates and submit prior to the beginning performance under this Agreement. Attached to each certificate of insurance shall be a copy of the Additional Insured Endorsement that is part of the Contractor's Commercial General Liability Policy, automotive and excess liability/umbrella policies. The coverage and amounts below are minimum requirements and do not establish limits to the Contractor's liability. Other coverage and higher limits may be provided at the Contractor's option and expense.

3. Worker's Compensation at statutory limits. New York State Disability Insurance and Paid Family Leave for all employees in New York. Employers' Liability for all employees in New York in an amount not less than \$500,000.00.
4. Commercial General Liability and Contractual Liability insurance to be provided on an "occurrence" basis, with coverage to include explosion, collapse and underground hazards (XCU). Blanket Contractual Products, Independent Contractors Completed Operations, Personal Injury, and Employees as additional insured, with limits of coverage to be:
 - a. Bodily Injury, Property Damage and Personal Injury Limits:
 - 1) \$1,000,000 each occurrence (Bodily Injury and Property Damage)
 - 2) \$2,000,000 General aggregate
 - 3) \$2,000,000 Products and Completed Operations Aggregate
 - 4) \$1,000,000 Personal and advertising injury
 - b. Aggregate shall apply to this project only (aggregate not to include other projects) and must be identified as such on the certificate of insurance.
5. Automotive Liability insurance including owned, non-owned, borrowed and hired automobiles with limits of coverage to be \$1,000,000 each occurrence for bodily injury and property damage (insurance on automobiles of subcontractors and material suppliers must meet the same requirements).
6. Umbrella/Excess Liability to provide insurance in excess of Employer's Liability, Commercial General Liability, and Automobile Liability policies required hereunder in the amount of \$5,000,000 each occurrence and in the aggregate.
7. The Contractor is responsible for insuring its own equipment, tools, and real and personal property.
8. Liability Insurance under a "claims-made" policy is not acceptable. Coverage must be provided on an "occurrence" basis.
9. Waiver of Subrogation: The Contractor waives all rights against the City and its agents, officers, directors and employees for recovery of damages to the extent the damages are covered by commercial general liability, umbrella liability, auto liability or workers compensation and employer's liability insurance maintained per requirements stated above.

B. Payment and Performance Bonds

1. The Contractor shall, at its cost and expense, furnish bonds in the amount of 100 percent of the amount to be paid pursuant to this Agreement (the "Contract Sum") covering the faithful performance of this Agreement and the payment of all obligations arising thereunder, in such form as the City may prescribe in this Article 11 and with such sureties as the City may approve. If the Contract Sum changes, the value of the bonds shall be adjusted to match the Contract Sum. The amount of the payment and performance bonds shall remain in full force and effect during the term of any warranty or guarantee to be furnished hereunder, and in no event for a period of less than one year following the issuance of final

payment. The Contractor shall keep the surety informed of any and all changes in the amount of this Agreement. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety insurance/bonds in New York State.

2. No work shall commence and the City has the option to void this Agreement unless the Contractor, at its sole cost and expense, shall secure and deliver to the City payment and performance bonds that comply with the requirements of this Article 11 and the Contract Documents within five (5) days of the date of the signing of this Agreement. The attorney in fact who executes the required bonds on behalf of the surety, shall affix thereto a certified and current copy of the power of attorney.
3. The bonds shall be written on AIA Document A312-2010 Performance Bond and Payment Bond and shall contain the following provisions in the modifications section of each bond or contain the following provisions in a rider attached to each bond that is referenced in the modifications section of each bond (for purposes of this paragraph Owner refers to the City and Contractor refers to the Contractor):
 - .1 Surety hereby agrees that it consents to and waives notice of any addition, alteration, omission, change, or other modification of the Contract Documents. Such addition, alteration, change, extension of time, or other modification of the Contract Documents, or a forbearance on the part of either the Owner or the Contractor to the other, shall not release the Surety of its obligations hereunder and notice to the Surety of such matters is hereby waived.
 - .2 Surety further agrees that in event of any default by the Owner in the performance of the Owner's obligations to the Contractor under the Contract, the Contractor or Surety shall cause written notice of such default (specifying said default in detail) to be given to the Owner, and the Owner shall have fifteen (15) days after receipt of such notice within which to cure such default, or such additional reasonable period of time as may be required if the nature of such default is such that it cannot be cured within fifteen (15) days. Such Notice of Default shall be sent by certified or registered U.S. Mail, return receipt requested, first class postage prepaid, to the Owner.
 - .3 Any proceeding, legal or equitable, under the Payment Bond may be instituted in any court of competent jurisdiction in the County of Dutchess in the State of New York and shall be instituted within three years after termination by the Owner of the Contractor's contract or within three years after final completion by the Contractor. In the event the Contractor files for bankruptcy, the commencement of the three-year period shall not start to run until the bankruptcy proceeding is finalized or the Owner obtains relief from an automatic stay, whichever is later.
3. The Contractor shall keep its surety informed of the progress of the Scope of Work, and, when necessary, obtain the surety's consent to, or waiver of: (1) request for reduction or release of retainage; (2) request for final payment; and (3) any other material required by the surety. The City may, in the City's sole discretion and without prior notice to the Contractor, through the Project Architect/Engineer or directly, inform the Contractor's surety of the progress of the Contractor's work and obtain consents as necessary to protect the City's

rights, interest, privileges and benefits under and pursuant to any bond issued in connection with this Agreement.

4. Upon the request of any person or entity appearing to be a potential beneficiary of the bonds covering payment of obligations arising under this Agreement, the Contractor shall promptly furnish a copy of the bonds and consents to the City or the Project Architect/Engineer furnishing a copy of the bonds to the potential beneficiaries upon request.

ARTICLE 12: INDEPENDENT CONTRACTOR

The Contractor and all its employees, officers, directors, associates, consultants, subcontractors, and agents shall be independent contractors to the City and shall not claim or receive any benefit or privilege conferred to the City employees, including, without limitation, disability or unemployment insurance, workers' compensation, medical insurance, sick leave, retirement, or any other employment benefit. The City shall not be responsible for the Contractor's compliance with any local, state, or federal law, regulation or requirement and shall not withhold any taxes, including payroll or income taxes, for the Contractor or any employee, officer, director, associate, subcontractor, consultant or agent thereof. The Contractor will indemnify the City for any tax liability, interest, and/or penalties imposed upon the City by any taxing authority based upon the City's failure to withhold any amount from the payments for tax purposes. The Contractor exclusively assumes responsibility for the acts of its employees, officers, directors, associates, consultants, subcontractors, and agents as they relate to this Agreement.

ARTICLE 13: NOTICES

All notices required or permitted to be given under this Agreement shall be in writing and shall be given by certified mail return receipt requested or by overnight or express mail services, addressed to the parties as designated below. Each such notice sent by overnight or express mail shall be deemed effective on the next business day after being dispatched and notices sent by certified mail shall be deemed effective on the fifth business day after being dispatched. Each party may change its address for written notice by giving written notice of such change in accordance with this Article 13. Notices shall be addressed to each party as follows:

As to the City:
City Hall, City of Beacon
1 Municipal Plaza
Beacon, NY 12508
Attn: Chris White, City Administrator

-and-

Keane & Beane, P.C.
445 Hamilton Avenue, Suite 1500
White Plains, NY 10601
Attn: Nicholas M. Ward-Willis, Esq.

As to the Contractor:

Attn: _____

ARTICLE 14: CHOICE OF LAW AND VENUE

This Agreement shall be governed by, and interpreted under, the laws of the State of New York, without consideration to its conflict of law's provisions. The venue for mediation, arbitration or legal proceedings arising out of this Agreement shall be Dutchess County in the State of New York. The parties agree that all actions or proceedings arising in connection with this Agreement shall be tried and litigated only in the State and Federal courts of Dutchess County in the State of New York. Each party hereby waives any right or claims that venue is improper in such a court.

ARTICLE 15: WAIVER

The failure of either party to enforce, at any time, any provision of this Agreement shall not constitute a waiver of such provision in any way or waive the rights of either party at any time to avail itself of such remedies as it may have for any breach or breaches of such provision. None of the conditions of this Agreement shall be considered waived by either party unless such waiver is given in writing by the waiving party. No such waiver shall be a waiver of any past or future default, breach, or modification or any of the terms or conditions of this Agreement unless expressly stipulated in such waiver.

ARTICLE 16: SEVERABILITY

If any term, provision, covenant or condition of this Agreement, or the application thereof to any person, place or circumstance, shall be held by a court of competent jurisdiction to be invalid, unenforceable or void, the remainder of this Agreement and such term, provision, covenant or condition as applied to other persons, places and circumstances shall remain in full force and effect.

ARTICLE 17: COUNTERPARTS

This Agreement may be executed in counterparts each of which shall be deemed an original and all of which taken together shall constitute one and the same Agreement. Delivery of an executed counterpart of this Agreement by facsimile or email shall be equally as effective as delivery of a manually executed counterpart of this Agreement.

ARTICLE 18: AUTHORITY TO ENTER AGREEMENT

The undersigned representative of the Contractor hereby represents and warrants that the undersigned is the owner or an officer, director, or agent of the Contractor with full legal rights, power and authority to enter into this Agreement on behalf of the Contractor and to bind the Contractor with respect to the obligations enforceable against the Contractor in this Agreement.

_____ **(CONTRACTOR)**

BY: _____
Signature

NAME: _____
Name Printed

TITLE: _____ DATE: _____

CITY OF BEACON

BY: _____

NAME: Christopher White

TITLE: City Administrator, City of Beacon

DATE: _____

Construction 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 Principal Place of Business):

OWNER (Name and Address):

CONSTRUCTION CONTRACT

Date:

Amount:

Description (Name and Location):

BOND

Date (Not earlier than Construction Contract Date):

Amount:

Modifications to this Bond Form:

CONTRACTOR AS PRINCIPAL

Company: (Corp. Seal)

Signature: _____

Name and Title:

SURETY

Company: (Corp. Seal)

Signature: _____

Name and Title:

CONTRACTOR AS PRINCIPAL

Company: (Corp. Seal)

Signature: _____

Name and Title:

SURETY

Company: (Corp. Seal)

Signature: _____

Name and Title:

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 Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except to participate in conferences as provided in Subparagraph 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 its address 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 Construction Contract. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction 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 Subparagraph 3.1; and

3.3. The Owner has agreed to pay the Balance of the Contract Price to the Surety in accordance with the terms of the Construction Contract or to a contractor selected to perform the Construction Contract in accordance with the terms of the contract with the Owner.

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 Construction Contract; or

4.2. Undertake to perform and complete the Construction 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 Construction 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 Construction 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's 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:

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

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 Subparagraph 4.4, and the Owner refuses the payment tendered or the Surety has denied liability, 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 Construction Contract, and if the Surety elects to act under Subparagraph 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 Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. To the 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 Construction Contract, the Surety is obligated without duplication for:

6.1. The responsibilities of the Contractor for correction of defective work and completion of the Construction 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 Construction 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 Construction 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 Construction 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 construction 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.

12. Definitions.

12.1. Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction 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 Construction Contract.

12.2. Construction 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 Construction Contract.

12.4. Owner Default: Failure of the Owner, which has neither been remedied nor waived, to pay the Contractor as required by the Construction 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 (Architect, Engineer or other party):

Construction Payment Bond

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

CONTRACTOR (Name and Address):

SURETY (Name and Principal Place of Business):

OWNER (Name and Address):

CONSTRUCTION CONTRACT

Date:

Amount

Description (Name and Location):

BOND

Date (Not earlier than Construction Contract Date):

Amount:

Modifications to this Bond Form:

CONTRACTOR AS PRINCIPAL

Company: (Corp. Seal)

Signature: _____

Name and Title:

SURETY

Company: (Corp. Seal)

Signature: _____

Name and Title:

CONTRACTOR AS PRINCIPAL

Company: (Corp. Seal)

Signature: _____

Name and Title:

SURETY

Company: (Corp. Seal)

Signature: _____

Name and Title:

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 Construction 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 claims, demands, liens or suits by any person or entity whose claim, demand, lien or suit is for payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, provided the Owner has promptly notified the Contractor and the Surety (at the address 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 address 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:

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

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 has indicated the claim will be paid directly or indirectly; and

3. Not having been paid within the above 30 days, have sent a written notice to the Surety (at the address 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 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 that 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 Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any Construction 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 Construction 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 Construction 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 Construction 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 of after the expiration of one year from the date (1) on which the Claimant gave the notice required by Subparagraph 4.1 or Clause 4.2 (iii), 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 address 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 construction was to be performed, any provision in the 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 by 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 Construction 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. Construction 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 Construction 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 (Architect, Engineer or other party):

NOTICE OF AWARD

Dated: _____

TO: _____
(Bidder)

ADDRESS: _____

PROJECT: West Main Pump Station and Force Main

OWNER'S CONTRACT NO.: COB Contract No. 2024-

CONTRACT FOR: West Main Pump Station and Force Main, City of Beacon, Dutchess County, New York

(Insert name of Contract, as it appears in the Bidding Documents)

You are notified that your Bid dated _____, for the above Contract has been considered.

You are the apparent Successful Bidder and have been awarded a contract for: The installation of a new sewage pump station and sewer force main in the City of Beacon

(Indicate total work, alternates or section or work awarded)

The Contract Price of your contract is: _____ (\$ _____)

_____ copies of each the proposed Contract Documents (except Drawings) accompany this Notice of Award.
_____ sets of the Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within **ten** (10) days of the date of this Notice of Award, that is by _____.

1. You must deliver to the Owner ___ fully executed counterparts of the Agreement including all the Contract Documents. This includes _____ sets of Drawings. Each of the Contract Documents and sets of Drawings must bear your signature on the cover page.
2. You must deliver with the executed Agreement the Contract Security (Bonds) as specified in the Instructions to Bidders, General Conditions (§ 5.1) and Supplementary Conditions.

3.(List other conditions precedents).

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

After you comply with the above conditions, OWNER will return to you one fully signed counterpart of the Agreement with the Contract Documents attached.

City of Beacon

(Owner)

BY:

(Authorized Signature) Christopher White

City Administrator

(Title)

ACCEPTANCE OF AWARD

(Contractor)

BY:

(Authorized Signature)

(Title)

(Date)

NOTICE TO PROCEED

Dated: _____
TO: _____
(Contractor)

ADDRESS: _____

PROJECT: West Main Pump Station and Force Main

OWNER'S CONTRACT NO.: COB Contract No. 2024-

CONTRACT FOR: West Main Pump Station & Force Main, City of Beacon, Dutchess County, NY

(Insert name of Contract, as it appears in the Bidding Documents)
You are notified that the Contract Times under the above contract will commence to run on _____.

By that date, you are to start performing your obligations under the Contract Documents. In accordance with the Agreement the date of completion and readiness for final payment is _____.

Before you may start any Work at the site, ¶2.7 of the General Conditions provides that you and Owner must each deliver to the other (with copies to ENGINEER and other identified additional insurers) certificates of insurance which each is required to purchase and maintain in accordance with the Contract Documents.

Also, before you may start any Work at the site, you must (add other requirements):

Comply with all of Metro-North Railroad requirements as set forth within the Contract and Easement Agreement.

City of Beacon
(Owner)

By: _____
(Authorized Signature) Christopher White

City Administrator
(Title)

ACCEPTANCE OF AWARD

(Contractor)

By: _____
(Authorized Signature)

(Title)

(Date)

CHANGE ORDER

(Instructions on reverse side)

No. _____

PROJECT _____

DATE OF ISSUANCE _____ EFFECTIVE DATE _____

OWNER _____

OWNER's Contract No. _____

CONTRACTOR _____ ENGINEER _____

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

Description:

Reason for Change Order:

Attachments: (List documents supporting change)

CHANGE IN CONTRACT PRICE:	CHANGE IN CONTRACT TIMES:
Original Contract Price \$ _____	Original Contract Times Substantial Completion: _____ Ready for final payment: _____ days or dates
Net changes from previous Change Orders No. _____ to No. _____ \$ _____	Net change from previous Change Orders No. _____ to No. _____ _____ days
Contract Price prior to this Change Order \$ _____	Contract Times prior to this Change Order Substantial Completion: _____ Ready for final payment: _____ days or dates
Net Increase (decrease) of this Change Order \$ _____	Net Increase (decrease) of this Change Order _____ days
Contract Price with all approved Change Orders \$ _____	Contract Times with all approved Change Orders Substantial Completion: _____ Ready for final payment: _____ days or dates

RECOMMENDED:

APPROVED:

ACCEPTED:

By: _____
Engineer (Authorized Signature)

By: _____
Owner (Authorized Signature)

By: _____
Contractor (Authorized Signature)

Date: _____

Date: _____

Date: _____

**CONTRACTOR'S AFFIDAVIT FOR RELEASE OF RETAINAGE
and/or
FINAL PAYMENT**

City of Beacon
Municipality

West Main Pump Station & Force Main
Project

COB Contract No. 2024-
Contract No.

Contractor
Address: _____

Telephone No.

State of _____ }
County of _____ } S.S.:

_____, being duly sworn deposes and says:

1. He is the _____ (TITLE) of the contractor on the above referenced project and makes this affidavit in the regular course of business with full authorization.

2. There are no claims, liens, or judgements against the contractor except as set forth herein:

(Insert "No Exceptions", if applicable - or - attach list, if necessary)

3. All provisions of the Labor Law of the State of New York have been fully complied with except as set forth herein:

(Insert "No Exceptions", if applicable - or - attach list, if necessary)

4. The municipality upon the release of retainage requested herewith, is released of any and all claims by the contractor with respect to the project to the date hereof.

5. This certification is made to include the municipality to release final payment and/or retainage held pursuant to the contract in accordance with General Municipal Law §106-b.

Subscribed and sworn to before
me on _____

Signature

Affix Seal,
if Corporation

Notary Public

GENERAL CONDITIONS

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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. *Limits - 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 by product 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 non-engineering or nontechnical rather than strictly construction-related aspects of the Contract Documents.

1.02 Technology

A. Intent of Certain Terms or Adjectives

1. Whenever in the Contract Documents the terms "**as allowed**," "**as approved**," or terms of like effect or import are used, 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 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 sixteenth 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 herein 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 hereby; 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

3.02 *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.

3.03 *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 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).

3.02 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.

3.03 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. Upon reasonable written request, OWNER shall furnish CONTRACTOR with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and OWNER's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

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

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 ENGINEER 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 such 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 or indicated 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, OWNER shall indemnify and hold harmless CONTRACTOR, Subcontractors, 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, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by CONTRACTOR or by anyone for whom CONTRACTOR is responsible. Nothing

in this paragraph 4.06.E shall obligate OWNER to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. 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.F shall obligate CONTRACTOR to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

I. 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

A. Unless otherwise provided in the Supplementary Conditions, OWNER shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an additional insured;

2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;

3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by **OWNER** prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by **ENGINEER**;

5. allow for partial utilization of the Work by **OWNER**;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by **OWNER**, **CONTRACTOR**, and **ENGINEER** with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.

B. OWNER shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of **OWNER**, **CONTRACTOR**, Subcontractors, **ENGINEER**, **ENGINEER's** Consultants, and any other individuals or entities identified in the Supplementary Conditions, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

C. All the policies of insurance (and the certificates or other evidence thereat) required to be purchased and maintained in accordance with paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to **OWNER** and **CONTRACTOR** and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with paragraph 5.07.

D. **OWNER** shall not be responsible for purchasing and maintaining any property insurance specified in this paragraph 5.06 to protect the interests of **CONTRACTOR**; Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by **CONTRACTOR**, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

E. If **CONTRACTOR** requests in writing that other special insurance be included in the property insurance policies provided under paragraph 5.06, **OWNER** shall, if possible, include such insurance, and the cost thereof will be charged to **CONTRACTOR** by appropriate Change Order or Written Amendment. Prior to commencement of the Work

at the Site, **OWNER** shall in writing advise **CONTRACTOR** whether or not such other insurance has been procured by "OWNER."

5.07 Waiver of Rights

A. **OWNER** and **CONTRACTOR** intend that all policies purchased in accordance with paragraph 5.06 will protect **OWNER**; **CONTRACTOR**, Subcontractors, **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) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. **OWNER** and **CONTRACTOR** waive all rights against each other and their respective officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them for all losses and damages caused by, arising on or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, **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) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by **OWNER** as trustee or otherwise payable under any policy so issued.

B. **OWNER** waives all rights against **CONTRACTOR**, Subcontractors, **ENGINEER**, **ENGINEER's** Consultants, and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to **OWNER's** property or the Work caused by, arising out of, or resulting from fire or other peril whether or not insured by **OWNER**; and

2. Loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by **OWNER** during partial utilization pursuant to paragraph 14.05, after Substantial Completion

pursuant to paragraph 14.04, or after final payment pursuant to paragraph 14.07.

C. Any insurance policy maintained by OWNER covering any loss, damage or consequential loss referred to in paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against CONTRACTOR, Subcontractors, ENGINEER, or ENGINEER's consultants and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

A. Any insured loss under the policies of insurance required by paragraph 5.06 will be adjusted with OWNER and made payable to OWNER as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of paragraph 5.08.B. OWNER shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order or Written Amendment.

B. OWNER as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to OWNER's exercise of this power. If such objection be made, OWNER as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, OWNER as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, OWNER as fiduciary shall give bond for the proper performance of such duties.

5.09 *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.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

A. If OWNER finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

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 Supplier 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) if 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;

b. CONTRACTOR 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 therefore. 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 space 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 *Canceling 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 issued or Written Amendment signed. No acceptance by OWNER of any such Subcontractor, Supplier, or other individual or entity, whether initially or as 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 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.

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work may be the subject of an adjustment in Contract Price or Contract Times. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in paragraph 10.05.

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. 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 shall 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.I.

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 cause 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 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 tangible property (other than the Work itself), including the loss of use resulting therefrom; and
2. is caused in whole or in part by any negligent act or omission of CONTRACTOR, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not caused in part by any negligence or omission of an individual or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Laws and Regulations regardless of the negligence of any such individual or entity.

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 extend to the liability of ENGINEER and ENGINEER's Consultants or to the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them arising out of:

1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

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 therefore, 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 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 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.

7.02 *Coordination*

A. If OWNER intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

B. Unless otherwise provided in the Supplementary Conditions, OWNER shall have sole authority and responsibility for such coordination.

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 *Replacement of ENGINEER*

A. In case of termination of the employment of ENGINEER, OWNER shall appoint an engineer to whom CONTRACTOR makes no reasonable objection, whose status under the Contract Documents shall be that of the former ENGINEER.

8.03 *Furnish Data*

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

8.04 *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.

8.05 *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.

8.06 Insurance

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

8.07 Change Orders

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

8.08 Inspections, Tests, and Approvals

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

8.09 Limitations on OWNER's Responsibilities

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

8.10 Undisclosed Hazardous Environmental Condition

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

8.11 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 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, a result of a Field Order, a Claim may be made therefore 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.

9.01 *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 therefore 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 30 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 60 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 formal 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 owner 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 claim 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 CON-

TRACTOR 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 hereof, and Suppliers' field services required in connection herewith. 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 U.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 written consent and approval of the 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, expeditors, timekeepers, clerks, and other personnel employed by CONTRACTOR, whether at the Site or in CONTRACTOR's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 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 allow-

ances 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 adequately to cover CONTRACTOR's overhead and profit for each separately identified item.

C. OWNER or CONTRACTOR may make a Claim for an adjustment in the Contract Price in accordance with paragraph 10.05 if:

1. the quantity of any item of Unit Price Work performed by CONTRACTOR differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

2. there is no corresponding adjustment with respect any other item of Work; and

3. if CONTRACTOR believes that CONTRACTOR is entitled to an increase in Contract Price as a result of having incurred additional expense or OWNER believes that OWNER is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 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 1f.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 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 therefore 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 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 ease 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 therefore 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 20 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 or other arrangements to protect OWNER's interest therein, all of which must be satisfactory to OWNER.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of CONTRACTOR stating that all previous progress payments received on account of the Work have been applied on account to discharge CONTRACTOR's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

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. Ten days after presentation of the Application for Payment to OWNER with ENGINEER's recommendations, 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 therefore. 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 paragraph 5.10 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 ten 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. Thirty 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.

14.08 *Final Completion Delayed*

A. 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.

14.09 *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 therefore 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 30 days to pay CONTRACTOR any sum formally 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 30 days to pay CONTRACTOR any sum formally 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.

SUPPLEMENTARY CONDITIONS

1. CONTRACTOR'S & SUBCONTRACTOR'S INSURANCE & LIMITS

The Contractor shall provide insurance as specified in the General Conditions with coverage not less than the following amounts or greater where required by law.

- Workmen's Compensation - Statutory
- Disability Benefits - Statutory
- Comprehensive Automobile Liability (including owned, non-owned, and hired autos)
Combined Single Limit (bodily injury and property damage) - \$1,000,000
- Comprehensive General Liability
(including contractual, products and completed operations coverage)
 1. General Aggregate - \$2,000,000
 2. Products and Completed Operations Aggregate - \$2,000,000
 3. Personal Injury - \$1,000,000
 4. Each Occurrence - \$1,000,000
 5. Umbrella/Excess Liability

THE CITY OF BEACON, LANC & TULLY ENGINEERING AND SURVEYING, P.C., TIGHE & BOND (T&B ENGINEERING, P.C.) SHALL BE NAMED ON ALL POLICIES AS ADDITIONAL INSURED.

The Contractor shall either:

1. Require each of his subcontractors to procure and to maintain during the life of his subcontract, Subcontractor's Public Liability and Property Damage of the type and in the same amounts and adding additional insureds as specified in the preceding paragraph;
or
2. Insure the activities of his subcontractors in his own policy.

2. SALES TAX

The City of Beacon is exempt from sales tax from the State of New York or any City or County in the State of New York for any material which is to be incorporated in this project. The City will make available to the successful bidder the tax exemption number and form to be used to the extent permitted under the present applicable statutes.

3. EQUAL EMPLOYMENT OPPORTUNITY

During the performance of this contract, the Contractor agrees as follows:

- A. The Contractor or subcontractor, where applicable, will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status or sex. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and

SUPPLEMENTARY CONDITIONS - *continued*

selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants; for employment, notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause:

- B. The Contractor or subcontractor, where applicable will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to age, race, creed, color, national origin, ancestry, marital status, or sex.
- C. The Contractor or subcontractor where applicable, will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency contracting officer, advising the labor union or workers' representative of the Contractor's commitments under this act and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- D. During the performance of this contract the Contractor or subcontractor agrees not to employ on such project any alien in the United States in violation of the Immigration and Nationality Act or any other law, convention, or treaty of the United States relating to the immigration, exclusion, deportation, or expulsion of aliens.

4. CLARIFICATION OF GENERAL CONDITIONS ¶4.05 "REFERENCE POINTS"

The Owner shall provide the following engineering surveys. Topographic survey maps, engineering site plans and construction details shall be supplied to Contractor. **NO** staking shall be done by the Owner. If staking is required by Contractor, it shall be done at Contractor's cost.

5. AMENDMENTS TO GENERAL CONDITIONS

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

- A. The Contractor shall have full responsibility for compliance with the Industrial Code including without limitation § 23 and 53. The Contractor shall have the duty to notify operators of underground facilities as provided therein. See also General Conditions, Paragraph 4.04.
- B. **No payment to the Contractor shall be due until thirty (30) days after audit and approval by the City Council at a regularly scheduled monthly meeting.**
- C. *The Contract:* It is understood that all the documents and/or specifications constitute a part of this agreement; that those documents are incorporated into this agreement as if set out at length at this point and that the award of the contract on the basis of the proposal constitutes a contract; the execution of this agreement being a mere formality.

SUPPLEMENTARY CONDITIONS - *continued*

- D. *Responsibility for Work:* The Contractor covenants and agrees at their own proper cost, charge and expense, to furnish all machinery, appliances, tools, labor and material necessary or proper to do all the work necessary to construct all the works, equipment and fixtures, appurtenant thereto, as set forth in the Contractor's proposal as accepted by the City.
- E. *Payment:* The City, in consideration of the Contractor faithfully complying with all the terms and conditions herein set forth agrees to pay the Contractor at the price as set forth in the Contractor's proposal as accepted by the Owner, upon the terms and conditions for monthly payments on estimates as may be set forth in the specifications. Payment requests shall be on properly completed forms provided by the City.
- F. *Interest in Contract:* The Contractor agrees that the only person or persons interested as principal or principals in the proposal submitted by the Contractor for this contract are named therein and that no person other than those mentioned therein, except regular agents of the Contractor, has any interest in the said proposal or in the securing of the award, and that this contract has been secured without any connection with any person or persons other than those named, and that the proposal is in all respects fair, and was prepared, and the contract was secured, without collusion or fraud, and that no officer or employee of the City has or shall have a financial interest in the performance of the contract or in the work or business to which it relates, or in any portion of the proceeds thereof.
- G. *Compliance with Law:* The Contractor agrees to comply with all applicable laws, rules and regulations; the cost of such compliance and the fees for any permits required will be at the expense of the Contractor.
- H. *Labor Law:* The Contractor agrees to comply with all applicable provisions of the Labor Law. Particular attention is drawn to the anti-discrimination provisions. Applicable wage determinations, as may be revised from time- to-time, shall be deemed inserted as if set forth at length at this point.
- I. *Required Provisions:* All provisions required by law to be inserted into this contract are hereby deemed inserted as if expressly set forth at this point.
- J. *Assignment:* This contract shall bind the parties, hereto, and their heirs, executors, administrators, successors and assigns respectively, and may not be assigned by the Contractor without written consent of the Owner.
- K. *Subcontractors:* The Owner reserves the right to approve all subcontractors. The Contractor will notify the Owner of the name and address of any such subcontractor intended for employment, the portion of the work which they are to do or the material which they are to furnish, their place of business and such other information as the Owner may require, in order to know whether such subcontractor is reputable and reliable and able to perform the work as called for in the specifications. The Contractor shall not be released from any liabilities or obligations under this contract, should any subcontractor fail to perform in a satisfactory manner the work undertaken by that subcontractor.

SUPPLEMENTARY CONDITIONS - *continued*

- L. *Indemnification and Insurance:* Neither the City nor any of its officers or agents shall in any manner be answerable or responsible for any loss or damage that shall or may happen during the performance of this contract by the Contractor, nor shall it be in any manner answerable or responsible for any injury done or damages or compensation required to be paid under any present or future law, to any person or persons whatever, whether employees of the Contractor or otherwise, or for damages to any property, whether belonging to the City or to others occurring during or resulting during the performance of this contract by the Contractor. Against all such injuries, damages and compensation, the Contractor shall and will properly guard. The Contractor shall also, at all times, indemnify and save the City and its officers and agents harmless against all such injuries, damages and compensation arising or resulting from the performance of this contract. The Contractor shall provide the City a certificate of insurance indicating insurance coverage acceptable to the City.
- M. *Time for Performance:* The Contractor shall proceed diligently toward the prompt completion of the work. The Contractor shall have no claim against the City for damages for delay unless the Owner is found to have caused such damage while acting in bad faith and with deliberate intent. The City agrees that the time for performance may, upon written application, be extended for such period of time as the governing board of the City deems reasonable upon the circumstances. Nothing herein shall limit the Contractor's rights against others causing such delays.
- N. *Remedies:* In addition to such remedies, the City may have in law or equity upon the Contractor's breach of this agreement, the City may terminate or suspend the agreement, or perform any part of the work at the expense of the Contractor as is determined to be in the best interest of the City.
- O. *Notice of Claim:* Service of a Verified Claim on the City Clerk within ninety (90) days of accrual of a claim against the City or completion of the work or portion thereof, whichever is earlier, and the expiration of forty (40) days thereafter shall be a condition precedent to the commencement by the Contractor of any action or proceeding with respect to this agreement. In no event shall an action be commenced by the Contractor subsequent to the tender of payment on the Contractor's final voucher under this agreement.
- P. The following revisions and/or additions are an expansion of the General Conditions and, therefore, the section listed below relate to the General Conditions.
 - 1.01 *Defined Terms*
 - A. 23. *Hazardous Environmental Condition*—Insert after the word “that” in the third line: requires reporting to any federal, state or local authority, or under circumstances that...

SUPPLEMENTARY CONDITIONS - *continued*

2.05 *Before Starting Construction*

- C. Evidence of Insurance: Before any work at the site is started, CONTRACTOR shall deliver to the OWNER, 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 my reasonably request) which CONTRACTOR is required to purchase and maintain in accordance with Article 5.

2.07 *Initial Acceptance of Schedules*

- A. 1. Insert at end of paragraph: Pursuant to paragraph 5(M) of the Supplementary Conditions' Amendments to General Conditions, the schedule will not determine to cost for delay claims against the OWNER.
3. Insert at end of paragraph: Pursuant to paragraph 5(M) of the Supplementary Conditions' Amendments to General Conditions, the schedule of values will not determine to cost for delay claims against the OWNER.

4.01 *Availability of Lands*

- C. Insert at end of paragraph: CONTRACTOR shall enter into a separate, written agreement with any and all landowners whose real property will be used for access or storage by CONTRACTOR in connection with this Agreement. Such agreement shall include express language that the City shall be held harmless by the landowner for any damage to the property caused by CONTRACTOR's activities thereon. CONTRACTOR shall ensure that such real property and any activity on such property is covered by the insurance required by this contract and provide a copy of the fully-executed agreement between CONTRACTOR and the landowner prior to commencement of any use or storage on the affected property.

4.02 *Subsurface and Physical Conditions*

- B. No reliance by CONTRACTOR on Technical Data: Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, and such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. CONTRACTOR may not rely upon or make any Claim against OWNER, ENGINEER, or any of ENGINEER'S Consultants with respect to:

4.03 *Differing Subsurface or Physical Conditions*

- A. 1. is of such a nature as to establish that any "technical data" is materially inaccurate; or
- C. Possible Time Adjustments
 - 1. The Contract Times, 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 time required for performance of the Work, however, such condition must meet any one or more of the categories described in paragraph 4.03.A.

SUPPLEMENTARY CONDITIONS - *continued*

b. delete

2. CONTRACTOR shall not be entitled to any adjustment in the Contract Times if:
3. If OWNER and CONTRACTOR are unable to agree on entitlement or on the amount or extent, if any, of any adjustment in the Contract Times, a Claim may be made therefore as provided in paragraph 10.05 concerning Contract Times only. 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.

4.03 *Differing Subsurface or Physical Conditions*

Insert: D. The CONTRACTOR shall be responsible for verifying any subsurface conditions before any work in such area commences. The CONTRACTOR shall not be entitled to any extra fee or extra compensation based upon the difference between actual subsurface conditions and data, information, or test results secured or furnished by any source. The CONTRACTOR agrees that it has satisfied itself by its own investigation and research regarding all the conditions affecting the work to be done and labor and material needed and that its conclusion to execute the contract is based on such information and research and not on the estimate of quantities or other information that ENGINEER has used in preparation of the Contract Documents.

4.04 *Underground Facilities*

- B. 1. Delete the words starting in the third line: “, or not shown or indicated with reasonable accuracy”
2. Delete the words starting in the eighth line: “or not shown or indicated with reasonable accuracy”

4.06 *Hazardous Environmental Condition at Site*

- 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 as they pertain to any hazardous environmental conditions at the site, 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

SUPPLEMENTARY CONDITIONS - *continued*

may not rely upon or make any Claim against, OWNER, ENGINEER, or any of ENGINEER'S Consultants with respect to:

5.04 *CONTRACTOR's Liability Insurance*

- A. Insert after the word "appropriate" in the second line: ", or as specified by OWNER,"

5.06 *Delete in entirety.*

5.07 *C. Delete in entirety.*

5.08 *Delete in entirety.*

5.10 *Delete in entirety.*

6.02 *Labor; Working Hours*

- B. Insert at the end of the paragraph: Subject to Article 12, CONTRACTOR shall be responsible for all additional costs and expenses, including overtime compensation, incurred as the result of CONTRACTOR, or any of its subcontractors, performing Work on Saturdays, Sundays or legal holidays, in order to comply with the Contract Times. Notwithstanding the preceding sentence, OWNER shall bear all such additional costs and expenses where CONTRACTOR, or its subcontractors, perform Work on weekends or legal holidays in order to comply with an acceleration of the Contract Times ordered in writing by OWNER.

6.11 *Use of Site and Other Areas*

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

1. Insert at end of paragraph: Nothing in this paragraph shall prohibit CONTRACTOR from entering into an agreement for access or storage of materials or equipment as provided for in paragraph 4.01(C).

6.17 *Shop Drawings and Samples*

F. *Resubmittal Procedures*

1. Insert after the word "approval" in the fourth line: "in accordance with a deadline set by ENGINEER."

9.01 *OWNER's Representative*

- A. Delete in the second line: "the construction period" and insert: "performance of all Work and during any modification or correction thereof."

10.06 The Contractor shall and will at no time make any claim for anticipated profit or loss of profits, because of any difference between the quantities of the various classes of work actually done, or of the materials actually furnished, and the original specified scope of work and the shown approximate estimated quantities.

SUPPLEMENTARY CONDITIONS - *continued*

10.07 The Contractor waives all claims of any nature due to a misunderstanding of the location, character, or other conditions surrounding the work or of the shown approximate estimated quantities of items of the work.

11.03 *Unit Price Work*

C. 1. - 3. Delete in entirety.

Insert: The CONTRACTOR agrees:

1. That he will make no claim of any nature against the OWNER or ENGINEER because of a difference between the quantities for unit price items of Work actually furnished and the estimated quantities state in the Bid even though the estimated quantities prove grossly different from the quantities actually used, and
2. That quantity of any unit price item or Work may be increased or decreased as may be deemed necessary without alteration or modification of the Contract.

Insert: D. In the event that the quantities of various items actually used are either higher or lower than the quantities stated in the Bid, the CONTRACTOR agrees as follows:

1. Where the change in quantities for any item in the regional bid does not exceed 20% of the original bid quantity, the applicable unit price bid shall be the sole basis for computing payment;
2. Where the change in quantities for any item in the original bid exceeds 20% of the original bid quantity, the OWNER, may review the unit price for said item to determine if a new unit price should be negotiated.

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 or claims for additional compensation arising out of or resulting from:

B. Delete in entirety.

13.07 *Correction Period*

A. Delete the words "one year" in the first line and insert the words "two years." Insert at the end of the paragraph: Nothing contained in this Paragraph 13.07 shall be construed to establish a period of limitation with respect to other obligations which the CONTRACTOR might have under the Contract Documents. Establishment of the time period of two years as describe in this paragraph relates only to the specific obligation of the CONTRACTOR to correct the Work and has no relationship to the time within which the

SUPPLEMENTARY CONDITIONS - *continued*

obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the CONTRACTOR's liability with respect to the CONTRACTOR's obligations other than specifically to correct the Work.

- B. Delete the word "Specifications" and insert the words "Contract Documents."

13.09 *OWNER May Correct Defective Work*

- A. Delete the words "a reasonable time" in the first line and insert the words "forty five (45) days."

14.02 *Progress Payments*

A. *Application for Payments*

1. Insert at the end of the paragraph: Notwithstanding the preceding sentence, OWNER shall not be required to pay CONTRACTOR, or any subcontractor, for materials or equipment delivered but not incorporated in the Work, except where such equipment or materials are in short or critical supply, as agreed to by the ENGINEER, or were specifically fabricated for the Work.

B. *Review of Applications*

3. Delete the phrase beginning in the third line: "inspections made to check the quality or 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" and insert: "the Work is free of defects not capable of discovery by ENGINEER in performing a reasonable inspection of the Work..."

14.10 *Payments to Subcontractors and Materialmen by Contractor*

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 materialmen as reflected in the payment from the Owner less an amount necessary to satisfy any claims, liens, or judgement against the subcontractor or materialmen which have not been suitably discharged and less any retained amount as hereafter described. The Contractor shall retain not more than 5% of each payment to the subcontractor and/or materialmen except that the Contractor may retain in excess of 5% but not more than 10% 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 the payments representing proceeds owned by the subcontractor and/or materialmen from the Owner's payments to the

SUPPLEMENTARY CONDITIONS - *continued*

Contractor from the remaining amounts of the contract balance as provided in Article 14.07 of this section. Within fifteen calendar days of the receipts of payment from the Contractor, the subcontractor and/or materialmen 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 monies to any subcontractor or materialmen from the 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. However, the Contractor shall retain nothing from the payments representing proceeds owned the subcontractor and/or materialmen from the Owner's payments to the Contractor from the remaining amounts of the contract balance as provided in Article 14.07 of this section. Within fifteen calendar days of the receipts of payment from the Contractor, the subcontractor and/or materialmen 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 monies to any subcontractor or materialmen from the Contractor nor shall anything provided herein serve to create any relationship in contract or otherwise, implied or expressed, between the subcontractor or materialmen and the Owner.

15.02 Owner May Terminate for Cause

5. The Contractor becomes insolvent;
6. The Contractor makes an assignment for the benefit of creditors pursuant to the statutes of the State of New York;
7. A voluntary or involuntary petition in bankruptcy is filed by or against the Contractor;
8. A receiver or receivers are appointed to take charge of the Contractor's property or affairs;
9. The Contractor shall sublet, assign, transfer, convey or otherwise dispose of the contractor other than as herein specified.

15.03 OWNER May Terminate For Convenience

3. Delete in entirety
- Q. Delete in its entirety Article 16 entitled "Dispute Resolution". The City of Beacon does not agree to participate in an arbitration concerning any controversy arising under this contract. The parties to this contract designate Dutchess County as the proper venue to commence any action arising from this contract.

SUPPLEMENTARY CONDITIONS - *continued*

6. SCHEDULE OF OCCUPATIONAL CLASSIFICATIONS & MINIMUM HOURLY WAGE RATES

Contractors and subcontractors are to meet "The Prevailing Wage Schedules" as published by New York State Department of Labor, attached herein.

NEW YORK STATE WAGE RATES



Kathy Hochul, Governor

Roberta Reardon, Commissioner

City of Beacon

John Russo
PO Box 687
Goshen NY 10924

Schedule Year 2023 through 2024
Date Requested 02/21/2024
PRC# 2024002117

Location City of Beacon
Project ID#
Project Type Construction of new sewage pump station and force main

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 2023 through June 2024. 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 12226

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.

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 from 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 12226; Fax to Bureau of Public Work (518) 485-1870; or electronically at the NYSDOL website www.labor.ny.gov.

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

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

Payrolls and Payroll Records

Every contractor and subcontractor **MUST** keep original payrolls or transcripts subscribed and affirmed as true under penalty of perjury. As per Article 6 of the Labor law, contractors and subcontractors are required to establish, maintain, and preserve for not less than six (6) years, contemporaneous, true, and accurate payroll records. At a minimum, payrolls must show the following information for each person employed on a public work project: Name, Address, Last 4 Digits of Social Security Number, Classification(s) in which the worker was employed, Hourly wage rate(s) paid, Supplements paid or provided, and Daily and weekly number of hours worked in each classification.

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

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

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

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

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

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

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

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

Withholding of Payments

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

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

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

Summary of Notice Posting Requirements

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

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

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

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

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

Apprentices

Employees cannot be paid apprentice rates unless they are individually registered in a program registered with the NYS Commissioner of Labor. The allowable ratio of apprentices to 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 12226 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

City of Beacon

John Russo
PO Box 687
Goshen NY 10924

Schedule Year 2023 through 2024
Date Requested 02/21/2024
PRC# 2024002117

Location City of Beacon
Project ID#
Project Type Construction of new sewage pump station and force main

Notice of Contract Award

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

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

Contractor Information

All information must be supplied

Federal Employer Identification Number: _____		
Name: _____		
Address: _____ _____		
City: _____	State: _____	Zip: _____
Amount of Contract: \$ _____	Contract Type:	
Approximate Starting Date: ____/____/____	<input type="checkbox"/> (01) General Construction	
Approximate Completion Date: ____/____/____	<input type="checkbox"/> (02) Heating/Ventilation	
	<input type="checkbox"/> (03) Electrical	
	<input type="checkbox"/> (04) Plumbing	
	<input type="checkbox"/> (05) Other : _____	

Phone: (518) 457-5589 Fax: (518) 485-1870
W. Averell Harriman State Office Campus, Bldg. 12, Room 130, Albany, NY 12226

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, <https://dol.ny.gov/public-work-and-prevailing-wage>

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.

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

Budget Policy & Reporting Manual

B-610

Public Work Enforcement Fund

effective date December 7, 2005

1. Purpose and Scope:

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

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

2. Background and Statutory References:

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

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

3. Procedures and Agency Responsibilities:

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

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

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

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

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

Reports should contain the following information:

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

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

Department of Labor
Administrative Finance Bureau-PWEF Unit
Building 12, Room 464
State Office Campus
Albany, NY 12226

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



Required Notice under Article 25-B of the Labor Law

**Attention All Employees, Contractors and Subcontractors:
You are Covered by the Construction Industry Fair Play Act**

The law says that you are an employee unless:

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

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

It is against the law for an employer to misclassify employees as independent contractors or pay employees off the books.

Employee Rights: If you are an employee, you are entitled to state and federal worker protections. These include:

- Unemployment Insurance benefits, if you are unemployed through no fault of your own, able to work, and otherwise qualified,
- Workers' compensation benefits for on-the-job injuries,
- Payment for wages earned, minimum wage, and overtime (under certain conditions),
- Prevailing wages on public work projects,
- The provisions of the National Labor Relations Act, and
- A safe work environment.

It is a violation of this law for employers to retaliate against anyone who asserts their rights under the law. Retaliation subjects an employer to civil penalties, a private lawsuit or both.

Independent Contractors: If you are an independent contractor, **you must pay all taxes and Unemployment Insurance contributions required by New York State and Federal Law.**

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

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

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

Employer Name:

IA 999 (09/16)



Attention Employees

THIS IS A: **PUBLIC WORK PROJECT**

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

Your pay stub and wage notice received upon hire must clearly state your wage rate and supplement rate.

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:
<https://dol.ny.gov/bureau-public-work>



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) 568-5287		

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

Contractor Name: _____

Project Location: _____

Requirements for OSHA 10 Compliance

Article 8 §220-h requires that when the advertised specifications, for every contract for public work, is \$250,000.00 or more the contract must contain a provision requiring that every worker employed in the performance of a public work contract shall be certified as having completed an OSHA 10 safety training course. The clear intent of this provision is to require that all employees of public work contractors, required to be paid prevailing rates, receive such training "prior to the performing any work on the project."

The Bureau will enforce the statute as follows:

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

Proof of completion may include but is not limited to:

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

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

Any questions regarding this statute may be directed to the New York State Department of Labor, Bureau of Public Work at 518-457-5589.

WICKS

Public work projects are subject to the Wicks Law requiring separate specifications and bidding for the plumbing, heating and electrical work, when the total project's threshold is \$3 million in Bronx, Kings, New York, Queens and, Richmond counties; \$1.5 million in Nassau, Suffolk and Westchester counties; and \$500,000 in all other counties.

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

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

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

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

Contractors must pay subcontractors within a 7 days period.

(07.19)

Introduction to the Prevailing Rate Schedule

Information About Prevailing Rate Schedule

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

Classification

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

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

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

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

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

Payrolls and Payroll Records

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

Every contractor and subcontractor shall submit to the Department of Jurisdiction (Contracting Agency), within thirty (30) days after issuance of its first payroll and every thirty (30) days thereafter, a transcript of the original payrolls, subscribed and affirmed as true under penalty of perjury.

Paid Holidays

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

Overtime

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

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

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

Supplemental Benefits

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

Effective Dates

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

Apprentice Training Ratios

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

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

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

Title (Trade)	Ratio
Boilermaker (Construction)	1:1,1:4
Boilermaker (Shop)	1:1,1:3
Carpenter (Bldg.,H&H, Pile Driver/Dockbuilder)	1:1,1:4
Carpenter (Residential)	1:1,1:3
Electrical (Outside) Lineman	1:1,1:2
Electrician (Inside)	1:1,1:3
Elevator/Escalator Construction & Modernizer	1:1,1:2
Glazier	1:1,1:3
Insulation & Asbestos Worker	1:1,1:3
Iron Worker	1:1,1:4
Laborer	1:1,1:3
Mason	1:1,1:4
Millwright	1:1,1:4
Op Engineer	1:1,1:5
Painter	1:1,1:3
Plumber & Steamfitter	1:1,1:3
Roofer	1:1,1:2
Sheet Metal Worker	1:1,1:3
Sprinkler Fitter	1:1,1:2

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

New York State Department of Labor
Bureau of Public Work
State Office Campus, Bldg. 12
Albany, NY 12226

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

Dutchess County General Construction

Boilermaker

02/01/2024

JOB DESCRIPTION Boilermaker

DISTRICT 4

ENTIRE COUNTIES

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

WAGES

Per Hour:	07/01/2023	01/01/2024
Boilermaker	\$ 65.88	\$ 67.38
Repairs & Renovations	65.88	67.38

Repairs & Renovation: Includes Repairing, Renovating replacement of parts to an existing unit(s).

SUPPLEMENTAL BENEFITS

Per Hour:

Boilermaker	33.5% of hourly	33.5% of Hourly
Repair \$ Renovations	Wage Paid	Wage Paid
	+ \$ 26.49	+ \$26.85

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

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

OVERTIME PAY

See (*B, O, **U) on OVERTIME PAGE

Note:* Includes 9th & 10th hours, double for 11th or more.

** Labor Day ONLY, if worked.

Repairs & Renovation see (B,E,Q) on OT Page

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 11, 12, 15, 25, 26, 29) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wage per hour:

(1/2) Year Terms at the following percentage of Boilermaker's Wage

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

Supplemental Benefits Per Hour:

Apprentice(s)	33.5% of Hourly Wage Paid Plus Amount Below	33.5% of Hourly Wage Paid Plus Amount Below
1st Term	\$ 20.12	\$ 20.36
2nd Term	21.03	21.28
3rd Term	21.95	22.22
4th Term	22.83	23.12
5th Term	23.76	24.07
6th Term	24.67	25.00
7th Term	25.58	25.93

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

4-5

Carpenter

02/01/2024

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

Dutchess, Orange

WAGES

Per hour: 07/01/2023

Building:
Millwright \$ 46.00
+ 8.17*

*This portion is not subject to overtime premiums

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 34.31

OVERTIME PAY

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

HOLIDAY

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

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

Overtime: See (5,6,11,13,16,18,19,25) on HOLIDAY PAGE.

REGISTERED APPRENTICES

Wages per hour:

One (1) year terms:

1st	2nd	3rd	4th
\$28.01	\$30.34	\$34.67	\$43.33
+ 4.27*	+ 5.06*	+ 5.81*	+ 7.31*

*This portion is not subject to overtime premiums

Supplemental benefits per hour:

1st	2nd	3rd	4th
\$22.55	\$24.34	\$26.45	\$29.18

8-740.2

Carpenter

02/01/2024

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

Dutchess

PARTIAL COUNTIES

Orange: : The territory west demarcated by a line drawn from the Bear Mountain Bridge continuing east to the Bear Mountain Circle. The territory south demarcated by a line continuing north on 9W to the town of Cornwall where County Road 107 (also known as Quaker Rd) crosses under 9W to the centerline of Route 32, The territories south and east heading 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

Per hour: 07/01/2023

Carpet/Resilient

Floor Coverer \$ 34.45
+ 3.25*

*This portion is not subject to overtime premiums

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

SUPPLEMENTAL BENEFITS

Per hour:

\$ 28.33

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (18, 19) on HOLIDAY PAGE

Paid for 1st & 2nd yr.

Apprentices: See (5, 6, 11, 13, 16, 18, 19, 25)

Overtime: See (5, 6, 11, 13, 16, 18, 19, 25) on HOLIDAY PAGE.

REGISTERED APPRENTICES

Wage per hour - (1) year terms:

1st	2nd	3rd	4th
\$15.75	\$18.87	\$23.55	\$28.23
+ 2.48*	+ 2.48*	+ 2.48*	+ 2.48*

*This portion is not subject to overtime premiums

Supplemental Benefits per hour - All apprentice terms:

\$ 20.87

8-2287D&O

Carpenter

02/01/2024

JOB DESCRIPTION Carpenter

DISTRICT 8

ENTIRE COUNTIES

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

WAGES

Per Hour: 07/01/2023

Marine Construction:

Marine Diver \$ 74.03
+ 9.79*

Marine Tender \$ 53.57
+ 9.79*

*This portion is not subject to overtime premiums

SUPPLEMENTAL BENEFITS

Per Hour:

Journeyworker \$ 45.34

OVERTIME PAY

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

HOLIDAY

Paid: See (18, 19) on HOLIDAY PAGE

Overtime: See (5, 6, 11, 13, 16, 18, 19, 25) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages per hour:

One (1) year terms.

1st year	\$ 25.60 + 5.30*
2nd year	31.20 + 5.30*
3rd year	39.58 + 5.30*
4th year	47.97 + 5.05*

*This portion is not subject to overtime premiums

Supplemental Benefits

Per Hour:

All terms \$ 31.83

8-1456MC

Carpenter - Building / Heavy&Highway

02/01/2024

JOB DESCRIPTION Carpenter - Building / Heavy&Highway

DISTRICT 11

ENTIRE COUNTIES

Columbia, Dutchess, Orange, Sullivan, Ulster

WAGES

WAGES (per hour)

Applies to Carpenter (Building/Heavy & Highway/Tunnel), Dockbuilder, Piledriver, Dive Tender, and Diver (Dry):

	07/01/2023	07/01/2024	07/01/2025	07/01/2026
		Additional	Additional	Additional
Base Wage	\$ 35.81	\$ 2.16**	\$ 2.23**	\$ 2.30**
	+ 4.88*			

Applies to Diver (Wet):

Base Wage	\$ 50.00
	+ 4.88*

*For all hours paid straight or premium.

**To be allocated at a later date.

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

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker	\$ 31.30
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OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

BUILDING:

Paid: See (1) on HOLIDAY PAGE.

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

- Holidays that fall on Sunday will be observed Monday.

HEAVY&HIGHWAY/TUNNEL:

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

Overtime: See (5, 6) on HOLIDAY PAGE

- Holidays that fall on Sunday will be observed Monday

- Must be employed during the five (5) work days immediately preceding a holiday or during the five (5) work days following the paid holiday to receive holiday pay

- If Employee is entitled to a paid holiday, the Employee is paid the Holiday wage and supplemental benefits whether they work or not. If Employee works the Holiday, the Employee will receive holiday pay (including supplemental benefits), plus the applicable premium wage for working the Holiday. If Employee works in excess of 8 hours on Holiday, then benefits will be paid for any hours in excess of 8 hours.

REGISTERED APPRENTICES

1 Year terms at the following wage rates.

1st	2nd	3rd	4th	5th
\$ 17.91	\$ 21.49	\$ 23.28	\$ 25.07	\$ 28.65
+2.58*	+2.58*	+2.58*	+2.58*	+2.58*

*For all hours paid straight or premium

SUPPLEMENTAL BENEFITS per hour:

All Terms	\$ 16.32
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11-279.2B/H&H

Electrician

02/01/2024

JOB DESCRIPTION Electrician

DISTRICT 11

ENTIRE COUNTIES

Orange, Putnam, Rockland

PARTIAL COUNTIES

Dutchess: Towns of Fishkill, East Fishkill, and Beacon.

WAGES

Per hour:

	07/01/2023	04/01/2024
Electrician Wireman/Technician	\$ 49.50	\$ 50.50
	+9.00*	+ 9.50*

SHIFT DIFFERENTIAL: On Public Work in New York State when shift work is mandated either in the job specifications or by the contracting agency, the following rates apply when shift is worked:

Between 4:30pm & 12:30am	\$ 58.08 + 9.00*	\$ 59.30 + 9.50*
Between 12:30am & 8:30am	\$ 65.06 + 9.00*	\$66.35 + 9.50*

*For all hours paid straight or premium, not to be included in 3% calculation for supplemental benefits.

NOTE ADDITIONAL AMOUNTS PAID FOR THE FOLLOWING WORK LISTED BELOW (subject to overtime premiums):

- On jobs where employees are required to work from boatswain chairs, swinging scaffolds, etc., forty (40) feet or more above the ground, or under compressed air, using Scottair packs, or gas masks, they shall receive an additional \$2.00 per hour above the regular straight time rate.

- Journeyman Wireman working in Shafts, Tunnels or on Barges: \$5.00 above the Journeyman Wireman rate of pay

- Journeyman Wireman when performing welding or cable splicing: \$3.00 above the Journeyman Wireman rate of pay

- Journeyman Wireman required to have a NYS Asbestos Certificate: \$3.00 above the Journeyman Wireman rate of pay

- Journeyman Wireman required to have a CDL: \$3.00 above the Journeyman Wireman rate of pay.

SUPPLEMENTAL BENEFITS

Per hour:	07/01/2023	04/01/2024
Journeyman	\$ 28.68 plus 3% of straight or premium wage	\$ 29.68 plus 3% of straight or premium wage

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6, 13, 15, 16, 25) on HOLIDAY PAGE

When the holiday falls on a Saturday it is observed the Friday before. When the holiday falls on a Sunday it is observed on the Monday after.

REGISTERED APPRENTICES

WAGES:

(1)year terms at the following rates

07/01/2023	1st	2nd	3rd	4th	5th	6th
1st Shift	\$ 14.25 +1.00*	\$ 19.00 +1.00*	\$ 23.75 +1.50*	\$ 28.50 +2.00*	\$ 33.25 +2.50*	\$ 35.63 +2.50*
2nd Shift	16.72 +1.00*	22.29 +1.00*	27.86 +1.50*	33.43 +2.00*	39.00 +2.50*	41.79 +2.50*
3rd Shift	18.72 +1.00*	24.97 +1.00*	31.21 +1.50*	37.45 +2.00*	43.69 +2.50*	46.82 +2.50*
09/01/2023	1st	2nd	3rd	4th	5th	6th
1st Shift	\$ 15.68 +1.00*	\$ 19.00 +1.00*	\$ 23.75 +1.50*	\$ 28.50 +2.00*	\$ 33.25 +2.50*	\$ 35.63 +2.50*
2nd Shift	18.39 +1.00*	22.29 +1.00*	27.86 +1.50*	33.43 +2.00*	39.00 +2.50*	41.79 +2.50*
3rd Shift	20.60 +1.00*	24.97 +1.00*	31.21 +1.50*	37.45 +2.00*	43.69 +2.50*	46.82 +2.50*
04/01/2024	1st	2nd	3rd	4th	5th	6th
1st Shift	\$ 16.01 +1.00*	\$ 19.40 +1.00*	\$ 24.25 +1.50*	\$ 29.10 +2.00*	\$ 33.95 +2.50*	\$ 36.38 +2.50*
2nd Shift	18.78 +1.00*	22.76 +1.00*	28.45 +1.50*	34.13 +2.00*	39.82 +2.50*	42.67 +2.50*
3rd Shift	21.04 +1.00*	25.49 +1.00*	31.86 +1.50*	38.24 +2.00*	44.61 +2.50*	47.80 +2.50*
09/01/2024	1st	2nd	3rd	4th	5th	6th
1st Shift	\$ 16.01 +1.00*	\$ 19.40 +1.00*	\$ 24.25 +1.00*	\$ 29.10 +2.00*	\$ 33.95 +2.50*	\$ 36.38 +2.50*
2nd Shift	18.78 +1.00*	22.76 +1.00*	28.45 +1.00*	34.13 +2.00*	39.82 +2.50*	42.67 +2.50*
3rd Shift	21.04 +1.00*	25.49 +1.00*	31.86 +1.00*	38.24 +2.00*	44.61 +2.50*	47.80 +2.50*

04/01/2025	1st	2nd	3rd	4th	5th	6th
1st Shift	\$ 16.34	\$ 19.80	\$ 24.75	\$ 29.70	\$ 34.65	\$ 37.13
	+1.00*	+1.00*	+1.00*	+2.00*	+2.50*	+2.50*
2nd Shift	19.17	23.23	29.03	34.84	40.64	43.55
	+1.00*	+1.00*	+1.00*	+2.00*	+2.50*	+2.50*
3rd Shift	21.47	26.02	32.52	39.03	45.53	48.79
	+1.00*	+1.00*	+1.00*	+2.00*	+2.50*	+2.50*

*For all hours paid straight or premium, not to be included in 3% calculation for supplemental benefits.

SUPPLEMENTAL BENEFITS per hour:

07/01/2023

1st term	\$ 16.28 plus 3% of straight or premium wage
2nd term	\$ 16.28 plus 3% of straight or premium wage
3rd term	\$ 18.28 plus 3% of straight or premium wage
4th term	\$ 18.78 plus 3% of straight or premium wage
5th term	\$ 20.28 plus 3% of straight or premium wage
6th term	\$ 20.28 plus 3% of straight or premium wage

09/01/2024

1st term	\$ 16.28 plus 3% of straight or premium wage
2nd term	\$ 17.78 plus 3% of straight or premium wage
3rd term	\$ 18.78 plus 3% of straight or premium wage
4th term	\$ 19.78 plus 3% of straight or premium wage
5th term	\$ 21.28 plus 3% of straight or premium wage
6th term	\$ 21.28 plus 3% of straight or premium wage

11-363/1

Electrician

02/01/2024

JOB DESCRIPTION Electrician

DISTRICT 11

ENTIRE COUNTIES

Sullivan, Ulster

PARTIAL COUNTIES

Delaware: Only in the Townships of Andes, Harpersfield, Kortwright, Stamford, Bovina, Roxbury, Middletown and those portions of Colchester and Hancock south of the East Branch of the Delaware River.

Dutchess: All of the county except for the towns of Fishkill, East Fishkill, and Beacon.

Greene: That portion of the county south of a line following the south limits of the city of Catskill in a Westerly direction from the Hudson River to Highway 23A along 23A to the road following the Little Westkill and continuing along this road to Delaware County.

WAGES

---IMPORTANT NOTE: Applies to all electrical wiring of single or multiple family dwellings and apartments up to and including two (2) stories that do not exceed four (4) unit apartments.

Per hour:

Electrician Wireman/ Technician Electrical/Technician Projects under \$ 250,000.00	07/01/2023	04/01/2024
	\$ 45.50	\$ 46.50
	+ 9.00*	+ 9.50*
over \$ 250,000.00	\$ 49.50	\$ 50.50
	+ 9.00*	+ 9.50*

SHIFT DIFFERENTIAL: On Public Work in New York State when shift work is mandated either in the job specifications or by the contracting agency, the following rates apply:

Shift worked between 4:30pm & 12:30am

Electrical/Technician Projects under \$ 250,000.00	\$ 53.39	\$ 54.56
	+ 9.00*	+ 9.50*
over \$ 250,000.00	\$ 58.08	\$ 59.30
	+ 9.00*	+ 9.50*

Shift worked between 12:30am & 8:30am

Electrical/Technician Projects under \$ 250,000.00	\$ 59.81	\$ 61.12
	+ 9.00*	+ 9.50*

over \$ 250,000.00	\$ 65.06 + 9.00*	\$ 66.35 + 9.50*
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*For all hours paid straight or premium, not to be included in 3% calculation for supplemental benefits.

NOTE ADDITIONAL AMOUNTS PAID FOR THE FOLLOWING WORK LISTED BELOW (subject to overtime premiums):

- On jobs where employees are required to work from boatswain chairs, swinging scaffolds, etc., forty (40) feet or more above the ground, or under compressed air, using Scottair packs, or gas masks, they shall receive an additional \$2.00 per hour above the regular straight time rate.
- Journeyman Wireman working in Shafts, Tunnels or on Barges: \$5.00 above the Journeyman Wireman rate of pay
- Journeyman Wireman when performing welding or cable splicing: \$3.00 above the Journeyman Wireman rate of pay
- Journeyman Wireman required to have a NYS Asbestos Certificate: \$3.00 above the Journeyman Wireman rate of pay
- Journeyman Wireman required to have a CDL: \$3.00 above the Journeyman Wireman rate of pay.

SUPPLEMENTAL BENEFITS

Per hour:	07/01/2023	04/01/2024
Journeyman	\$ 28.68 plus 3% of straight or premium wage	\$ 29.68 plus 3% of straight or premium wage

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE
Overtime: See (5, 6, 13, 15, 16, 25) on HOLIDAY PAGE

When the holiday falls on a Saturday it is observed the Friday before. When the holiday falls on a Sunday it is observed on the Monday after.

REGISTERED APPRENTICES

WAGES:

(1)year terms at the following rates

07/01/2023	1st	2nd	3rd	4th	5th	6th
1st Shift	\$ 14.25 +1.00*	\$ 19.00 +1.00*	\$ 23.75 +1.50*	\$ 28.50 +2.00*	\$ 33.25 +2.50*	\$ 35.63 +2.50*
2nd Shift	16.72 +1.00*	22.29 +1.00*	27.86 +1.50*	33.43 +2.00*	39.00 +2.50*	41.79 +2.50*
3rd Shift	18.72 +1.00*	24.97 +1.00*	31.21 +1.50*	37.45 +2.00*	43.69 +2.50*	46.82 +2.50*
09/01/2023	1st	2nd	3rd	4th	5th	6th
1st Shift	\$ 15.68 +1.00*	\$ 19.00 +1.00*	\$ 23.75 +1.50*	\$ 28.50 +2.00*	\$ 33.25 +2.50*	\$ 35.63 +2.50*
2nd Shift	18.39 +1.00*	22.29 +1.00*	27.86 +1.50*	33.43 +2.00*	39.00 +2.50*	41.79 +2.50*
3rd Shift	20.60 +1.00*	24.97 +1.00*	31.21 +1.50*	47.45 +2.00*	43.69 +2.50*	46.82 +2.50*
04/01/2024	1st	2nd	3rd	4th	5th	6th
1st Shift	\$ 16.01 +1.00*	\$ 19.40 +1.00*	\$ 24.25 +1.50*	\$ 29.10 +2.00*	\$ 33.95 +2.50*	\$ 36.38 +2.50*
2nd Shift	18.78 +1.00*	22.76 +1.00*	28.45 +1.50*	34.13 +2.00*	39.82 +2.50*	42.67 +2.50*
3rd Shift	21.04 +1.00*	25.49 +1.00*	31.86 +1.50*	38.24 +2.00*	44.61 +2.50*	47.80 +2.50*
09/01/2024	1st	2nd	3rd	4th	5th	6th
1st Shift	\$ 16.01 +1.00*	\$ 19.40 +1.00*	\$ 24.25 +1.00*	\$ 29.10 +2.00*	\$ 33.95 +2.50*	\$ 36.38 +2.50*
2nd Shift	18.78 +1.00*	22.76 +1.00*	28.45 +1.00*	34.13 +2.00*	39.82 +2.50*	42.67 +2.50*
3rd Shift	21.04 +1.00*	25.49 +1.00*	31.86 +1.00*	38.24 +2.00*	44.61 +2.50*	47.80 +2.50*
04/01/2025	1st	2nd	3rd	4th	5th	6th
1st Shift	\$ 16.34 +1.00*	\$ 19.80 +1.00*	\$ 24.75 +1.00*	\$ 29.70 +2.00*	\$ 34.65 +2.50*	\$ 37.13 +2.50*
2nd Shift	19.17 +1.00*	23.23 +1.00*	29.03 +1.00*	34.84 +2.00*	40.64 +2.50*	43.55 +2.50*

3rd Shift	21.47 +1.00*	26.02 +1.00*	32.52 +1.00*	39.03 +2.00*	45.53 +2.50*	48.79 +2.50*
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*For all hours paid straight or premium, not to be included in 3% calculation for supplemental benefits.

SUPPLEMENTAL BENEFITS per hour:

07/01/2023

1st term	\$ 16.28 plus 3% of straight or premium wage
2nd term	\$ 16.28 plus 3% of straight or premium wage
3rd term	\$ 18.28 plus 3% of straight or premium wage
4th term	\$ 18.78 plus 3% of straight or premium wage
5th term	\$ 20.28 plus 3% of straight or premium wage
6th term	\$ 20.28 plus 3% of straight or premium wage

09/01/2024

1st term	\$ 16.28 plus 3% of straight or premium wage
2nd term	\$ 17.78 plus 3% of straight or premium wage
3rd term	\$ 18.78 plus 3% of straight or premium wage
4th term	\$ 19.78 plus 3% of straight or premium wage
5th term	\$ 21.28 plus 3% of straight or premium wage
6th term	\$ 21.28 plus 3% of straight or premium wage

11-363/2

Elevator Constructor

02/01/2024

JOB DESCRIPTION Elevator Constructor

DISTRICT 1

ENTIRE COUNTIES

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

PARTIAL COUNTIES

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

Rockland: Only the Township of Stony Point.

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

WAGES

Per Hour	07/01/2023	01/01/2024
Mechanic	\$ 67.35	\$ 70.15
Helper	70% of Mechanic Wage Rate	70% of Mechanic Wage Rate

NOTE - The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30, 2023 will expire within the granted time frame.

For Pre-Registered Projects 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. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour	07/01/2023	01/01/2024
Journeyman/Helper	\$ 37.335*	\$ 37.885*

(*)Plus 6% of regular hourly if less than 5 years of service. Plus 8% of regular hourly rate if more than 5 years of service.

OVERTIME PAY

See (D, O) on OVERTIME PAGE

HOLIDAY

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

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

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

REGISTERED APPRENTICES

Wages per hour:

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

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

Supplemental Benefits per hour worked:

Same as Journeyperson/Helper

1-138

Glazier**02/01/2024**

JOB DESCRIPTION Glazier**DISTRICT** 8**ENTIRE COUNTIES**

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

WAGES

Per hour: 7/01/2023

Glazier & Glass Tinting \$ 61.64

*Scaffolding 65.64

Window Film

**Repair & Maintenance 30.76

*Scaffolding includes swing scaffold, mechanical equipment, scissor jacks, man lifts, booms & buckets 30' or more, but not pipe scaffolding.

**Repair & Maintenance- All repair & maintenance work on a particular building whenever performed, where the total cumulative Repair & Maintenance contract value is under \$184,000.

SUPPLEMENTAL BENEFITS

Per hour: 7/01/2023

Glazier & Glass Tinting \$ 40.20

Window Film

Repair & Maintenance 23.19

OVERTIME PAY

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

For 'Repair & Maintenance' see (B, B2, I, S) on overtime page.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

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

For 'Repair & Maintenance'

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

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

REGISTERED APPRENTICES

Wage per hour:

(1) year terms at the following wage rates:

7/01/2023

1st term \$ 21.93

2nd term 30.05

3rd term 39.95

4th term 48.97

Supplemental Benefits:

(Per hour)

1st term \$ 18.25

2nd term 25.97

3rd term 31.27

4th term 34.32

8-1087 (DC9 NYC)

Insulator - Heat & Frost**02/01/2024**

JOB DESCRIPTION Insulator - Heat & Frost**DISTRICT** 8**ENTIRE COUNTIES**

Dutchess, Orange, Putnam, Rockland, Westchester

WAGES

Per hour:	07/01/2023	06/01/2024
Insulator	\$ 59.25	+ \$ 2.50
Discomfort & Additional Training**	62.31	+ \$ 2.50
Fire Stop Work*	31.77	+ \$ 2.50

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

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

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

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker	\$ 37.35
Discomfort & Additional Training	39.39
Fire Stop Work: Journeyworker	19.03

OVERTIME PAY

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

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

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

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

*Note: Labor Day triple time if worked.

REGISTERED APPRENTICES

(1) year terms:

Insulator Apprentices:

1st	2nd	3rd	4th
\$ 31.77	\$ 37.26	\$ 42.76	\$ 48.26

Discomfort & Additional Training Apprentices:

1st	2nd	3rd	4th
\$ 33.30	\$ 39.09	\$ 44.90	\$ 50.71

Supplemental Benefits paid per hour:

Insulator Apprentices:

1st term	\$ 19.03
2nd term	22.69
3rd term	26.36
4th term	30.03

Discomfort & Additional Training Apprentices:

1st term	\$ 20.06
2nd term	23.92
3rd term	27.78
4th term	31.66

8-91

Ironworker

02/01/2024

JOB DESCRIPTION Ironworker

DISTRICT 11

ENTIRE COUNTIES

Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster

WAGES

Per hour:

	07/01/2023	07/01/2024 Additional	07/01/2025 Additional	07/01/2026 Additional
Structural	\$ 52.63	\$ 2.00*	\$ 2.00*	\$2.00*
Reinforcing*	52.63	2.00*	2.00*	2.00*
Ornamental	52.63	2.00*	2.00*	2.00*
Chain Link Fence	52.63	2.00*	2.00*	2.00*

* To be allocated at a later date.

NOTE: For Reinforcing classification ONLY, Ironworker 4-46Reinf rates apply in Rockland County's southern section (south of Convent Road and east of Blue Hills Road).

On Government Mandated Irregular Work Days or Shift Work, the following wage will be paid:

1st Shift	\$ 52.63
2nd Shift	67.34
3rd Shift	72.24

**Note- Any shift that works past 12:00 midnight shall receive the 3rd shift differential.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman	\$ 43.47
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OVERTIME PAY

See (B1, Q, V) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

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

If a holiday falls on Saturday, it will be observed Friday. If a holiday falls on Sunday, it will be observed Monday.

REGISTERED APPRENTICES

Wages:

(1) year terms at the following wage:

	1st yr	2nd yr	3rd yr	4th yr
1st Shift	\$ 26.32	\$ 31.58	\$ 36.85	\$ 42.10
2nd Shift	36.16	42.40	48.64	54.86
3rd Shift	39.45	46.00	52.57	59.12

Supplemental Benefits per hour:

1st year	\$ 37.35
2nd year	38.57
3rd year	39.80
4th year	41.02

11-417

Laborer - Building

02/01/2024

JOB DESCRIPTION Laborer - Building

DISTRICT 11

ENTIRE COUNTIES

Dutchess

PARTIAL COUNTIES

Columbia: Only the Townships of Greenport, Claverack, Philmont, Clermont, Germantown, Livingston, Hillsdale, Gallatin, Copake, Ancram, Taghkanic and the City of Hudson.

WAGES

ALL WORK RELATED WITH TOXIC OR ANY ASBESTOS OR HAZARDOUS MATERIAL

WAGES: (per hour)

	07/01/2023	06/01/2024	06/01/2025 Additional	06/01/2026 Additional
Class 4	\$ 47.30	\$ 49.00	\$ 2.90*	\$ 3.00*

*To be allocated at a later date.

These rates will cover all work within five feet of the building foundation line.

Shift Differential: On all Governmental mandated irregular or off shift work, an additional 25% of wage is required. The 25% shift differential will be paid on public works contract for shifts or irregular workdays outside the normal working hours for 2nd and 3rd shifts or irregular work day or when mandated or required by state, federal, county, local or other governmental agency contracts.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman	\$ 32.40	\$ 33.50
Shift	39.46	\$ 40.84

OVERTIME PAY

See (B, *E, E5, **Q) on OVERTIME PAGE

*For first 8 hours on Saturday

**When an employee is required to work on a holiday which falls on a Sunday the employee shall be paid three (3) times the hourly rate and one (1) hour benefits for every hour worked. When an employee is required to work on a holiday which falls on a Saturday the employee shall be paid two and a half (2.5) times the hourly rate and one hour benefits for every hour worked.

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

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

Holidays that fall on Saturday shall be observed on Friday, when holidays fall on Sunday they shall be observed on Monday.

REGISTERED APPRENTICES

(1000) hour terms at the following wages.

	07/01/2023	06/01/2024
1st term	\$ 27.05	\$ 28.05
2nd term	31.25	32.35
3rd term	35.40	36.70
4th term	39.55	41.00

Supplemental Benefits per hour:

All Terms Regular	\$ 28.33	\$ 29.23
All Terms Shift Rate	34.27	TBD

11-17tox B

Laborer - Building

02/01/2024

JOB DESCRIPTION Laborer - Building

DISTRICT 8

ENTIRE COUNTIES

Dutchess

PARTIAL COUNTIES

Columbia: Only the Townships of Ancram, Claverack, Clermont, Copake, Gallatin, Germantown, Greenport, Hillsdale, Hudson, Livingston, Philmont and Taconic.

WAGES

GROUP # 1:

All Laborers except those listed in Group 2

GROUP # 2:

Blaster, Laser Beam Oper., Asphalt Rakers, & Drilling Equipment Only Where a Separate Air Compressor Unit Supplies Power

WAGES per hour

	07/01/2023	06/01/2024
GROUP # 1	\$ 39.00*	+ \$ 2.00
GROUP # 2	41.35*	+ \$ 2.00

*Subtract \$ 4.50 to calculate overtime premium

Note: Any job requiring Hazwopper Certification will pay \$1.00 above job classification wage rate.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman \$ 28.60

OVERTIME PAY

See (B, F, R) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

Note: Whenever a holidays falls on Sunday, it will be observed on the following Monday.

REGISTERED APPRENTICES

Wages per hour: 07/01/2023

1000 Hour terms

1st term	\$ 28.08
2nd term	31.90
3rd term	35.72
4th term	39.54

Note: Any job requiring Hazwopper Certification will pay \$1.00 above job classification wage rate.

Supplemental Benefits per hour:

All terms \$ 23.20

8-235

Laborer - Heavy&Highway

02/01/2024

JOB DESCRIPTION Laborer - Heavy&Highway

DISTRICT 8

ENTIRE COUNTIES

Dutchess

PARTIAL COUNTIES

Columbia: Only the Townships of Ancram, Claverack, Clermont, Copake, Gallatin, Germantown, Greenport, Hillsdale, Hudson, Livingston, Philmont and Taconic.

WAGES

GROUP I: Blaster, Asphalt Screedman, ACI Certified Flatwork Finisher, Pipe Jacking and Boring Operations, Operator Qualified Dead Condition Pipe Fuser (B Mechanic)

GROUP II: Burner, Drill Operator, Jumbo Driller, Wagon Driller, Air Track Driller, Hydraulic Driller, Self Contained Rotary Drill Operator, Pneumatic Dowel Driller, Concrete Form Aligner, Concrete Form and Curb Form Highway, Concrete Finisher, Asphalt Raker, Pipe Fusion, Wrecking "Bar Person", Operator Qualified Peer Checker.

GROUP III: Asphalt Curb Machine Operator, Jeepers Operator, Pavement Breaker Operator, Power Saw Operator, Jack Hammer Drill, all types Pneumatic Tool and Gasoline Drill, Concrete Saw, Gunning, Railroad, Spike Puller, Sandblasting, Shoring, Pipe Layer, Deck Winches on Scows, Power Buggy and Operator, Power Wheelbarrow Operator, Laser Beam and X-Ray Operator, Pipe Religner, Underpinning, Chain Saw, Tree Cutter, Jack Leg Driller, Hydraulic Rock Splitter, certified, Certified Scaffold Erector, Remote Controlled Demolition Robot, Wrecking "Bar Person" Helper, Utility Per Diem Laborer, Compressed air-lance, Water jet lance

Group IV: General Concrete Laborers - anything pertaining to concrete, aggregate or concrete material handling, Puddlers, Asphalt Worker, Crack Router Operator, Rock Scalers, Vibrator Operator, Bit Grinder, Concrete Grinder, Remote Walk Behind Roller (Wacker, Rammax, etc), Air Tampers and All Tampers not covered by any other classification, Form Pin Pullers, Pumps and their operation, Service of Air Power, Epoxy and Waterproofing Worker, Fine Grade person between forms, Barco Rammer, Guard Rail Installation and Demolition Link Fence, Steel Kings, Wire Mesh, Setting of all Paving Blocks, Brick Paver and Rubber Pavers, Rip Rap and Dry Stone Layer Wall, Stone Work and Pointing, Cement Spray Men, Gabion Basket Assembler, Installation of Noise Barrier, Jersey Barrier and Joints, Pre-Cast Manholes, and Pre-cast and Pre-cast Catch Basins, Crib Retaining Walls

Group V: All Driller Helpers(including Hydraulic Wagon Air Track). Common Laborers, Certified Fire Watch Laborers, All AFL/CIO Trades, Signal Person Truck Spotters, Power Person, Landscaping and Nursery Person, Artificial Turf, Placing Fabric on Landfill, Sign Installer, Temporary and Interim Pavement Line Striping, String Line Automation Grades, Lock Level, Certified Traffic Safety and Control (Pattern)

Group V (A): Flagperson

Group VI: Confined Space Laborer

WAGES per hour	07/01/2023	05/01/2024
Group I:	\$ 48.05	+ \$ 2.25
Group II:	46.70	+ \$ 2.25
Group III:	46.30	+ \$ 2.25
Group IV:	45.95	+ \$ 2.25
Group V:	45.60	+ \$ 2.25
Group V(A):	39.25	+ \$ 2.25
Group VI:	47.60	+ \$ 2.25

Note: All employees working on a project that requires Hazwopper Certification will receive \$1.00 per hour over job classification rate of pay.

SUPPLEMENTAL BENEFITS

Per hour:	07/01/2023
Journeyman	\$ 28.05
	38.35*

*Applies for contracting agency mandated irregular shift work

OVERTIME PAY

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

HOLIDAY

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

Note: Whenever a holidays falls on Sunday, it will be observed on the following Monday.

REGISTERED APPRENTICES

Wages per hour

1000 hour year terms

1st Term	\$ 28.08
2nd Term	31.90
3rd Term	35.72
4th Term	39.54

Note: All employees working on a project that requires Hazwopper Certification will receive \$1.00 per hour over job classification rate of pay. All employees who work an irregular work day that starts after 9:00 AM on a governmental mandated schedule shall be paid an additional 15% per hour.

Supplemental Benefits per hour:	
All Terms	\$ 23.20

8-235h

Laborer - Heavy&Highway

02/01/2024

JOB DESCRIPTION Laborer - Heavy&Highway

DISTRICT 11

ENTIRE COUNTIES

Dutchess

PARTIAL COUNTIES

Columbia: Only the Townships of Claverack, Clermont, Greenport, Philmont, Germantown, Livingston, Hillsdale, Taghkanic, Gallatin, Copake, Ancram, City of Hudson.

WAGES

ALL WORK RELATED WITH TOXIC OR ANY ASBESTOS OR HAZARDOUS MATERIAL, BIO REMEDIATION AND PHYTO REMEDIATION(Five feet or more outside of building foundation line)

WAGES:(per hour)	07/01/2023	06/01/2024
Class 3	\$ 49.40	Additional \$ 2.45*

* To be allocated at a later date.

SHIFT DIFFERENTIAL: Night work and irregular shift require 20% increase on wages for all Government mandated night and irregular shift work.

NOTE - The 'Employer Registration' (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30,2023 will expire within the granted time frame.

For Pre-Registered Projects 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. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour:	
Journeyman	\$ 32.28
Shift	37.96

OVERTIME PAY

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

*For Mon-Fri Holidays, Double Benefits to be paid for all hours worked.

**For Saturday Holidays, Two and one Half Benefits for all hours worked.

***For Sunday Holidays, Triple Benefits for all hours worked.

HOLIDAY

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

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

To be eligible for a paid holiday, an employee must work at least two (2) days in the calendar week or payroll week in which the holiday falls.

REGISTERED APPRENTICES

(1000) hour terms at the following wages.

	07/01/2023	06/01/2024
1st term	\$ 27.05	\$ 28.05
2nd term	31.25	32.35
3rd term	35.40	36.70
4th term	39.55	41.00

Supplemental Benefits per hour:

All Terms Regular	\$ 28.33	\$ 29.23
All Terms Shift Rate	33.08	TBD

11-17tox HH

Laborer - Tunnel

02/01/2024

JOB DESCRIPTION Laborer - Tunnel

DISTRICT 11

ENTIRE COUNTIES

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

PARTIAL COUNTIES

Chenango: Townships of Columbus, Sherburne and New Berlin.

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

WAGES

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

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

Class 4: Safety Miners

Class 5: Site work related to Shaft/Tunnel

WAGES: (per hour)

	07/01/2023	06/01/2024	06/01/2025
Class 1	\$ 55.55	\$ 57.05	\$ 58.55
Class 2	57.70	59.20	60.70
Class 4	64.10	65.60	67.10
Class 5	47.65	49.90	51.40

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

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

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

SUPPLEMENTAL BENEFITS

Per hour:

Benefit 1	\$ 35.73	\$ 36.98	\$ 38.23
Benefit 2	51.01	TBD	TBD
Benefit 3	71.28	TBD	TBD

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

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

Benefit 3 applies to Sunday and Holiday hours worked.

OVERTIME PAY

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

HOLIDAY

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

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

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

REGISTERED APPRENTICES

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

11-17/60/235/754Tun

Lineman Electrician

02/01/2024

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

A 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, assembly of all electrical materials, conduit, pipe, 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.

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

NOTE: Includes Teledata Work within ten (10) feet of High Voltage Transmission Lines. Also includes digging of holes for poles, anchors, footer, and foundations for electrical equipment.

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)

Per hour:	07/01/2023	05/06/2024
Lineman, Technician	\$ 57.40	\$ 58.90
Crane, Crawler Backhoe	57.40	58.90
Welder, Cable Splicer	57.40	58.90
Digging Mach. Operator	51.66	53.01
Tractor Trailer Driver	48.79	50.07
Groundman, Truck Driver	45.92	47.12
Equipment Mechanic	45.92	47.12
Flagman	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	\$ 57.40	\$ 58.90
Crane, Crawler Backhoe	57.40	58.90
Cable Splicer	63.14	64.79
Certified Welder,		
Pipe Type Cable	60.27	61.85
Digging Mach. Operator	51.66	53.01
Tractor Trailer Driver	48.79	50.07
Groundman, Truck Driver	45.92	47.12
Equipment Mechanic	45.92	47.12
Flagman	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	\$ 58.72	\$ 60.22
Crane, Crawler Backhoe	58.72	60.22
Cable Splicer	64.59	66.24
Certified Welder, Pipe Type Cable	61.66	63.23
Digging Mach. Operator	52.85	54.20
Tractor Trailer Driver	49.91	51.19
Groundman, Truck Driver	46.98	48.18
Equipment Mechanic	46.98	48.18
Flagman	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	\$ 59.91	\$ 61.41
Crane, Crawler Backhoe	59.91	61.41
Cable Splicer	59.91	61.41
Digging Mach. Operator	53.92	55.27
Tractor Trailer Driver	50.92	52.20
Groundman, Truck Driver	47.93	49.13
Equipment Mechanic	47.93	49.13
Flagman	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 %

NOTE - The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30, 2023 will expire within the granted time frame.

For Pre-Registered Projects 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. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour:

	07/01/2023	05/06/2024
Lineman, Technician, or Equipment Operators with Crane License	\$ 29.40 *plus 7% of the hourly wage paid	\$ 30.90 *plus 7% of the hourly wage paid
All other Journeyman	\$ 26.40 *plus 7% of the hourly wage paid	\$ 26.90 *plus 7% of the hourly wage paid

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

OVERTIME PAY

See (B, E, Q, X) 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:

07/01/2023	05/06/2024
\$ 26.40	\$ 26.90
*plus 7% of the hourly wage paid	*plus 7% of the hourly wage paid

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

6-1249a

Lineman Electrician - Teledata

02/01/2024

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).

	07/01/2023	01/01/2024	01/01/2025
Cable Splicer	\$ 37.73	\$ 39.24	\$ 40.81
Installer, Repairman	\$ 35.81	\$ 37.24	\$ 38.73
Teledata Lineman	\$ 35.81	\$ 37.24	\$ 38.73
Tech., Equip. Operator	\$ 35.81	\$ 37.24	\$ 38.73
Groundman	\$ 18.98	\$ 19.74	\$ 20.53

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:	07/01/2023	01/01/2024	01/01/2025
Journeyman	\$ 5.70	\$ 5.70	\$ 5.70
	*plus 3% of the hourly wage paid	*plus 3% of the hourly wage paid	*plus 3% of the hourly 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

02/01/2024

JOB DESCRIPTION Lineman Electrician - Traffic Signal, Lighting

DISTRICT 6

ENTIRE COUNTIES

Columbia, Dutchess, Orange, Putnam, Rockland, Ulster

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

A flagger's duties shall consist of traffic control only.
(Ref #14.01.02)

Per hour:	07/01/2023	05/06/2024
Lineman, Technician	\$ 50.60	\$ 51.82
Crane, Crawler Backhoe	50.60	51.82
Certified Welder	53.13	54.41
Digging Machine	45.54	46.64
Tractor Trailer Driver	43.01	44.05
Groundman, Truck Driver	40.48	41.46
Equipment Mechanic	40.48	41.46
Flagman	30.36	31.09

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%

NOTE - The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30, 2023 will expire within the granted time frame.

For Pre-Registered Projects 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. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour worked (but also required on non-worked holidays):

	07/01/2023	05/06/2024
Lineman, Technician, or Equipment Operators with Crane License	\$ 29.40 *plus 7% of the hourly wage paid	\$ 30.90 *plus 7% of the hourly wage paid
All other Journeyman	\$ 26.40 *plus 7% of the hourly wage paid	\$ 26.90 *plus 7% of the hourly wage paid

*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 and Governor of NYS Election Day.

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

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

REGISTERED APPRENTICES

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

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

SUPPLEMENTAL BENEFITS per hour:

07/01/2023	05/06/2024
\$ 26.40	\$ 26.90
*plus 7% of the hourly wage paid	*plus 7% of the hourly wage paid

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

6-1249aReg8LT

Lineman Electrician - Tree Trimmer

02/01/2024

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:	07/01/2023	12/31/2023
Tree Trimmer	\$ 29.80	\$ 31.44
Equipment Operator	26.35	27.80
Equipment Mechanic	26.35	27.80
Truck Driver	21.95	23.15
Groundman	18.07	19.07
Flag person	14.20	14.20*

*NOTE- Rate effective on 01/01/2024 - \$15.00 due to minimum wage increase

SUPPLEMENTAL BENEFITS

Per hour:

	07/01/2023	12/31/2023
Journeyman	\$ 10.48	\$ 10.48
	*plus 4.5% of the hourly wage paid	*plus 4.5% of the hourly wage paid

* The 4.5% is based on the hourly wage paid, straight time rate or premium rate.

OVERTIME PAY

See (B, E, Q, X) 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

02/01/2024

JOB DESCRIPTION Mason - Building

DISTRICT 9

ENTIRE COUNTIES

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

WAGES

Per Hour:

07/01/2023 7/03/2023

Marble Cutters & Setters \$ 62.82 \$ 63.12

SUPPLEMENTAL BENEFITS

Per Hour:

Journeyworker \$ 39.03 \$ 39.34

OVERTIME PAY

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

HOLIDAY

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

REGISTERED APPRENTICES

Wage Per Hour:

07/01/2023

750 hour terms at the following wage

1st	2nd	3rd	4th	5th	6th	7th	8th
0- 3000	3001- 3750	3751- 4500	4501- 5250	5251- 6000	6001- 6750	6751- 7500	7500+
\$ 26.42	\$ 39.62	\$ 42.91	\$ 46.22	\$ 49.52	\$ 53.38	\$ 59.67	\$ 62.82

Supplemental Benefits per hour:

07/01/2023

1st	2nd	3rd	4th	5th	6th	7th	8th
\$ 25.38	\$ 28.86	\$ 29.74	\$ 30.60	\$ 31.48	\$ 36.44	\$ 38.17	\$ 39.03

07/03/2023

Wage Per Hour:

750 hour terms at the following wage.

1st	2nd	3rd	4th	5th	6th	7th	8th
0- 3000	3001- 3750	3751- 4500	4501- 5250	5251- 6000	6001- 6750	6751- 7500	7500+
\$ 26.60	\$ 39.82	\$ 43.13	\$ 46.45	\$ 49.78	\$ 53.64	\$ 59.95	\$ 63.12

Supplemental Benefits Per Hour:

1st	2nd	3rd	4th	5th	6th	7th	8th
\$ 25.54	\$ 29.09	\$ 29.97	\$ 30.84	\$ 31.72	\$ 36.73	\$ 38.48	\$ 39.34

9-7/4

Mason - Building

02/01/2024

JOB DESCRIPTION Mason - Building

DISTRICT 11

ENTIRE COUNTIES

Dutchess, Sullivan, Ulster

PARTIAL COUNTIES

Orange: Entire county except the Township of Tuxedo.

WAGES

Per hour:

07/01/2023

Bricklayer	\$ 45.00
Cement Mason	45.00
Plasterer/Stone Mason	45.00
Pointer/Caulker	45.00

Additional \$1.00 per hour for power saw work

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

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

Irregular workday requires 15% premium

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

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

SUPPLEMENTAL BENEFITS

Per hour:

Journeyman	\$ 37.39
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OVERTIME PAY

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

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

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

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

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

REGISTERED APPRENTICES

Wages per hour:

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

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

Supplemental Benefits per hour

750 hour terms at the following percentage of journeyman supplements

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

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

11-5du-b

Mason - Building

02/01/2024

JOB DESCRIPTION Mason - Building

DISTRICT 9

ENTIRE COUNTIES

Dutchess, Orange, Putnam, Sullivan, Ulster

WAGES

Per hour:

07/01/2023

12/04/2023

06/03/2024

Building:

Additional

Tile, Marble,& Terrazzo

Mechanic/Setter \$ 57.29

\$ 57.72

\$ 0.64

SUPPLEMENTAL BENEFITS

Per Hour:

Journeyworker: \$ 23.06*
+ \$7.68

\$ 23.26*
+\$7.69

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

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

Double time rate applies after 10 hours

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

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

REGISTERED APPRENTICES

Wage per hour:

(Counties of Orange & Putnam)

750 hour terms at the following wage rate:

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
1-	751-	1501-	2251-	3001-	3751-	4501-	5251-	6001-	6751-
750	1500	2250	3000	3750	4500	5250	6000	6750	7500
07/01/2023									
\$21.70	\$26.66	\$33.75	\$38.69	\$42.25	\$45.70	\$49.29	\$54.23	\$57.09	\$61.25
12/04/2023									
\$21.96	\$26.95	\$34.10	\$39.08	\$42.68	\$46.16	\$49.79	\$54.77	\$57.66	\$61.90

Supplemental Benefits per hour:

(Counties of Orange & Putnam)

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
07/01/2023									
\$12.55*	\$12.55*	\$15.36*	\$15.36*	\$16.36*	\$17.86*	\$18.86*	\$18.86*	\$16.86*	\$22.11*
+\$0.73	+\$0.78	+\$0.88	+\$0.88	+\$1.37	+\$1.42	+\$1.83	+\$1.88	+\$6.03	+\$6.61
12/04/2023									
\$12.55*	\$12.55*	\$15.36*	\$15.36*	\$16.36*	\$17.86*	\$18.86*	\$18.86*	\$16.86*	\$22.11*
+\$0.73	+\$0.78	+\$0.89	+\$0.94	+\$1.38	+\$1.43	+\$1.84	+\$1.89	+\$6.04	+\$6.62

Wages per hour:

(Counties of Dutchess, Sullivan, Ulster)

750 hour terms at the following wage rate:

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
1-	751-	1501-	2251-	3001-	3751-	4501-	5251-	6001-	6751-
750	1500	2250	3000	3750	4500	5250	6000	6750	7500
07/01/2023									
\$19.83	\$23.92	\$25.89	\$29.98	\$32.74	\$36.32	\$39.61	\$42.71	\$44.31	\$47.73

Supplemental Benefits per hour:

(Counties of Dutchess, Sullivan, Ulster)

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
07/01/2023									
\$12.55*	\$12.55*	\$14.66*	\$14.66*	\$15.60*	\$16.16*	\$16.66*	\$17.66*	\$15.66*	\$20.41*
+\$0.65	+\$0.69	+\$0.74	+\$0.78	+\$1.15	+\$1.19	+\$1.53	+\$1.57	+\$6.09	+\$6.18

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

9-7/52B

Mason - Building	02/01/2024
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JOB DESCRIPTION Mason - Building	DISTRICT 9
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ENTIRE COUNTIES
Dutchess, Orange, Putnam, Sullivan, Ulster

WAGES

Per hour:	07/01/2023	12/04/2023	06/03/2024
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Building			Additional
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Tile, Marble, & Terrazzo Finisher	\$ 47.06	\$ 47.51	\$ 0.54
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SUPPLEMENTAL BENEFITS

Journeyworker:

Per Hour	\$ 20.16*	\$ 20.26*
	+ \$7.55	+ \$7.55

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

OVERTIME PAY

See (A, *E, Q) on OVERTIME PAGE
Double time rate applies after 10 hours on Saturdays.

HOLIDAY

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

9-7/88B-tf

Mason - Heavy&Highway	02/01/2024
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JOB DESCRIPTION Mason - Heavy&Highway	DISTRICT 11
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ENTIRE COUNTIES
Dutchess, Sullivan, Ulster

PARTIAL COUNTIES
Orange: Entire county except the Township of Tuxedo.

WAGES

Per hour:	07/01/2023
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Bricklayer	\$ 45.50
Cement Mason	45.50
Marble/Stone Mason	45.50
Plasterer	45.50
Pointer/Caulker	45.50

Additional \$1.00 per hour for power saw work
Additional \$0.50 per hour for swing scaffold or staging work

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

Irregular workday requires 15% premium
Second shift an additional 15% of wage plus benefits to be paid
Third shift an additional 25% of wage plus benefits to be paid

SUPPLEMENTAL BENEFITS

Per hour:	
Journeyman	\$ 37.39

OVERTIME PAY

Cement Mason	See (B, E, Q, W)
All Others	See (B, E, Q)

HOLIDAY

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

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

- Supplemental Benefits are not paid for paid Holiday
- If Holiday is worked, Supplemental Benefits are paid for hours worked.
- Whenever an Employee works within three (3) calendar days before a holiday, the Employee shall be paid for the Holiday.

REGISTERED APPRENTICES

Wages per hour:

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

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

Supplemental Benefits per hour

750 hour terms at the following percentage of journeyman supplements

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

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

11-5du-H/H

Operating Engineer - Building

02/01/2024

JOB DESCRIPTION Operating Engineer - Building

DISTRICT 9

ENTIRE COUNTIES

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

PARTIAL COUNTIES

Dutchess: that part of Dutchess County lying south of the North City Line of the City of Poughkeepsie.

WAGES

NOTE: Construction surveying

Party Chief--One who directs a survey party

Instrument Man--One who runs the instrument and assists Party Chief.

Rodman--One who holds the rod and assists the Survey Crew

Wages:(Per Hour) 07/01/2023

Building Construction:

Party Chief	\$ 77.39
Instrument Man	61.25
Rodman	41.39

Steel Erection:

Party Chief	80.16
Instrument Man	63.60
Rodman	44.23

Heavy Construction-NYC counties only:
(Foundation, Excavation.)

Party Chief	85.74
Instrument man	64.40
Rodman	54.90

SUPPLEMENTAL BENEFITS

Per Hour: 07/01/2023

Building Construction \$ 28.04* +\$ 7.65

Steel Erection 28.64* +\$ 7.65

Heavy Construction 28.85* +\$ 7.64

* This portion subject to same premium as wages

Non-Worked Holiday Supplemental Benefit:

21.19

OVERTIME PAY

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

Code "A" applies to Building Construction and has double the rate after 7 hours on Saturdays.

Code "B" applies to Heavy Construction and Steel Erection and had double the rate after 8 hours on Saturdays.

HOLIDAY

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

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

9-15Db

Operating Engineer - Building

02/01/2024

JOB DESCRIPTION Operating Engineer - Building

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

PARTIAL COUNTIES

Dutchess: All the counties of Westchester and Putnam and the southern part of Dutchess County defined by the northern boundary line of the City of Poughkeepsie, then due east to Route 115, then north along Route 115 to Bedell Road, then east along Bedell Road to Van Wagner Road, then north along Van Wagner Road to Bower Road, then east along Bower Road to Route 44 and along Route 44 east to Route 343, then along Route 343 east to the northern boundary of Town of Dover Plains and east along the northern boundary of Town of Dover Plains to the border line of the State of Connecticut and bordered on the west by the middle of the Hudson River.

WAGES

GROUP I:

Cranes (All Types up to 49 tons), Boom Trucks, Cherry Pickers (All Types), Clamshell Crane, Derrick (Stone and Steel), Dragline, Franki Pile Rig or similar, High Lift (Lull or similar) with crane attachment and winch used for hoisting or lifting, Hydraulic Cranes, Pile Drivers, Potain and similar.

Cranes (All types 50-99 tons), Drill Rig Casa Grande (CAT or similar), Franki Pile Rig or similar, Hydraulic Cranes (All types including Crawler Cranes- No specific boom length).

Cranes (All types 100 tons and over), All Tower Cranes, All Climbing Cranes irrespective of manufacturer and regardless of how the same is rigged, Franki Pile Rig or similar, Conventional Cranes (All types including Crawler Cranes-No specific boom length), Hydraulic Cranes.

GROUP I-A: Barber Green Loader-Euclid Loader, Bulldozer, Carrier-Trailer Horse, Concrete Cleaning Decontamination Machine Operator, Concrete-Portable Hoist, Conway or Similar Mucking Machines, Elevator & Cage, Excavators all types, Front End Loaders, Gradall, Shovel, Backhoe, etc.(Crawler or Truck), Heavy Equipment Robotics Operator/Mechanic, Hoist Engineer-Material, Hoist Portable Mobile Unit, Hoist(Single, Double or Triple Drum), Horizontal Directional Drill Locator, Horizontal Directional Drill Operator and Jersey Spreader, Letourneau or Tournapull(Scrapers over 20 yards Struck), Lift Slab Console, etc., Lull HiLift or Similar, Master Environmental Maintenance Mechanics, Mucking Machines Operator/Mechanic or Similar Type, Overhead Crane, Pavement Breaker(Air Ram), Paver(Concrete), Post Hole Digger, Power House Plant, Road Boring Machine, Road Mix Machine, Ross Carrier and Similar Machines, Rubber tire double end backhoes and similar machines, Scoopmobile Tractor-Shovel Over 1.5 yards, Shovel (Tunnels), Spreader (Asphalt) Telephie(Cableway), Tractor Type Demolition Equipment, Trenching Machines-Vermeer Concrete Saw Trencher and Similar, Ultra High Pressure Waterjet Cutting Tool System, Vacuum Blasting Machine operator/mechanic, Winch Truck A Frame.

GROUP I-B: Compressor (Steel Erection), Mechanic (Outside All Types), Negative Air Machine (Asbestos Removal), Push Button (Buzz Box) Elevator.

GROUP II: Compactor Self-Propelled, Concrete Pump, Crane Operator in Training (Over 100 Tons), Grader, Machines Pulling Sheep's Foot Roller, Roller (4 ton and over), Scrapers (20 yards Struck and Under), Vibratory Rollers, Welder.

GROUP III-A: Asphalt Plant, Concrete Mixing Plants, Forklift (All power sources), Joy Drill or similar, Tractor Drilling Machine, Loader (1 1/2 yards and under), Portable Asphalt Plant, Portable Batch Plant, Portable Crusher, Skid Steer (Bobcat or similar), Stone Crusher, Well Drilling Machine, Well Point System.

GROUP III-B: Compressor Over 125 cu. Feet, Conveyor Belt Machine regardless of size, Compressor Plant, Ladder Hoist, Stud Machine.

GROUP IV-A: Batch Plant, Concrete Breaker, Concrete Spreader, Curb Cutter Machine, Finishing Machine-Concrete, Fine Grading Machine, Hepa Vac Clean Air Machine, Material Hopper(sand, stone, cement), Mulching Grass Spreader, Pump Gypsum etc, Pump-Plaster-Grout-Fireproofing. Roller(Under 4 Ton),Spreading and Fine Grading Machine, Steel Cutting Machine, Siphon Pump, Tar Joint Machine, Television Cameras for Water, Sewer, Gas etc. Turbo Jet Burner or Similar Equipment, Vibrator (1 to 5).

GROUP IV-B: Compressor (all types), Heater (All Types), Fire Watchman, Lighting Unit (Portable & Generator) Pump, Pump Station(Water, Sewer, Portable, Temporary), Welding Machine (Steel Erection & Excavation).

GROUP V: Mechanics Helper, Motorized Roller (walk behind), Stock Attendant, Welder's Helper, Maintenance Engineer Crane(75 ton and over).

Group VI-A: Welder Certified
GROUP VI-B: Utility Man, Warehouse Man.

WAGES: (per hour)

	07/01/2023	03/04/2024
GROUP I		
Cranes- up to 49 tons	\$ 66.23	\$ 67.43
Cranes- 50 tons to 99 tons	68.53	69.77
Cranes- 100 tons and over	78.21	79.64
GROUP I-A	58.01	59.04
GROUP I-B	53.48	54.41
GROUP II	55.98	56.97
GROUP III-A	53.94	54.88
GROUP III-B	51.35	52.25
GROUP IV-A	53.40	54.33
GROUP IV-B	45.17	45.94
GROUP V	48.69	49.53
Group VI-A	56.96	57.96
GROUP VI-B		
Utility Man	46.21	47.00
Warehouse Man	48.52	49.26

An additional 20% to wage when required to wear protective equipment on hazardous/toxic waste projects.
Engineers operating cranes with booms 100 feet but less than 149 feet in length will be paid an additional \$2.00 per hour.
Engineers operating cranes with booms 149 feet or over in length will be paid an additional \$3.00 per hour.
Loader operators over 5 cubic yard capacity additional .50 per hour.
Shovel operators over 4 cubic yard capacity additional \$1.00 per hour.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker	\$ 31.57	\$ 32.32
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OVERTIME PAY

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

HOLIDAY

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

8-137B

Operating Engineer - Building

02/01/2024

JOB DESCRIPTION Operating Engineer - Building

DISTRICT 1

ENTIRE COUNTIES

Albany, Clinton, Columbia, Essex, Franklin, Fulton, Greene, Hamilton, Herkimer, Montgomery, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Warren, Washington

PARTIAL COUNTIES

Dutchess: Defined as north of the northern boundary line of City of Poughkeepsie then due east to Route 115 to Bedell Road then east along Bedell Road to VanWagner Road then north along VanWagner Road to Bower Road then east along Bower Road to Rte. 44 east to Route 343 then along Route 343 east to the northern boundary of Town of Dover Plains and east along the northern boundary of Town of Dover Plains to Connecticut.

WAGES

CLASS A1*: Cranes, tower cranes, hydraulic cranes, locomotive crane, piledriver, cableway, derricks, whirlies, dragline, boom trucks (over 5 tons).

CLASS A:

Shovel, Excavators 18,001 lbs. and above(including rubber tire full swing), Gradalls, power road grader, all CMI equipment, front-end rubber tire loader, tractor-mounted drill (quarry master), mucking machine, concrete central mix plant, concrete pump, belcrete system, automated asphalt concrete plant, and tractor road paver, boom trucks 5 tons and under, maintenance engineer, self-contained crawler drill-hydraulic rock drill.

CLASS B:

Excavators 18,000 lbs. and under, Backhoes (rubber tired backhoe/loader combination), bulldozer, pushcat, tractor, traxcavator, scraper, LeTourneau grader, form fine grader, self-propelled soil compactor (fill roller), asphalt roller, blacktop spreader, power brooms, sweepers, trenching machine, Barber Green loader, side booms, hydro hammer, concrete spreader, concrete finishing machine, one drum hoist, power hoisting (single drum), hoist two drum or more, three drum engine, power hoisting (two drum and over), two drum and swinging engine, three drum swinging engine, hod hoist, A-L frame winches, core and well drillers (one drum), post hole digger, model CHB Vibro-Tamp or similar machine, batch bin and plant operator, dinky locomotive, skid steer loader, track excavator 5/8 cubic yard or smaller, front end rubber tired loader under four cubic yards, vacuum machine (mounted or towed).

CLASS C:

Fork lift, high lift, all terrain fork lift: or similar, oiler, fireman and heavy-duty greaser, boilers and steam generators, pump, vibrator, motor mixer, air compressor, dust collector, welding machine, well point, mechanical heater, generators, temporary light plants, electric submersible pumps 4" and over, murphy type diesel generator, conveyor, elevators, concrete mixer, beltcrete power pack (belcrete system), seeding, and mulching machines, pumps, rotating telehandler (that does not require NYS crane license).

*** In the event that equipment listed above is operated by robotic control, the classification covering the operation will be the same as if manually operated.

WAGES per hour

	07/01/2023	07/01/2024
Class A1*	\$ 50.93	\$ 53.11
Class A	50.44	52.62
Class B	49.42	51.60
Class C	46.52	48.70

(*) TONNAGE RATING PREMIUMS:

Note: Additional value subject to same premiums as shown for OT

All cranes 1000 tons and over, A1 rate plus \$7.00

All cranes 800-999 tons, A1 rate plus \$6.00

All cranes 600-799 tons, A1 rate plus \$5.00

All cranes 400-599 tons, A1 rate plus \$4.00

All cranes 200-399 tons, A1 rate plus \$3.00

All cranes 111-199 tons, A1 rate plus \$2.25

All cranes 110 tons and under, A1 rate only

Additional \$0.50 per hr on A1 rate for Tower Cranes.

Additional \$2.50 per hr over B rate for Nuclear Leader work.

Additional \$2.50 per hour if work requires Personal Protective Equipment for hazardous waste site activities with a level C or over rating.

NOTE - The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30, 2023 will expire within the granted time frame.

For Pre-Registered Projects 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. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour

	07/01/2023	07/01/2024
Journeyman	\$ 31.30	\$32.40

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

NOTE: All hours worked on designated holidays shall be paid a double the hourly rate of pay plus 8 hours of straight time.

NOTE: If a holiday falls on Sunday, it will be celebrated on Monday. If the holiday falls on Saturday, it will be celebrated on Friday.

REGISTERED APPRENTICES

Wages per hour

1000 hours terms at the following percentage of Journeyperson's wage Class B

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

Supplemental Benefits per hour worked

	07/01/2023	07/01/2024
All terms	\$ 26.60	\$27.70

1-158 Alb

Operating Engineer - Heavy&Highway

02/01/2024

JOB DESCRIPTION Operating Engineer - Heavy&Highway

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

PARTIAL COUNTIES

Dutchess: All the counties of Westchester and Putnam and the southern part of Dutchess County defined by the northern boundary line of the City of Poughkeepsie, then due east to Route 115, then north along Route 115 to Bedell Road, then east along Bedell Road to Van Wagner Road, then north along Van Wagner Road to Bower Road, then east along Bower Road to Route 44 and along Route 44 east to Route 343, then along Route 343 east to the northern boundary of Town of Dover Plains and east along the northern boundary of Town of Dover Plains to the border line of the State of Connecticut and bordered on the west by the middle of the Hudson River.

WAGES

GROUP I: Boom Truck, Cherry Picker, Clamshell, Crane, (Crawler, Truck), Dragline, Drill Rig (Casa Grande, Cat, or Similar), Floating Crane (Crane on Barges) under 100 tons, Gin Pole, Hoist Engineer-Concrete (Crane-Derrick-Mine Hoist), Knuckle Boom Crane, Rough Terrain Crane.

GROUP I-A: Auger (Truck or Truck Mounted), Boat Captain, Bulldozer-All Sizes, Central Mix Plant Operator, Chipper (all types), Close Circuit T.V., Combination Loader/Backhoe, Compactor with Blade, Concrete Finishing Machine, Gradall, Grader (Motor Grader), Elevator & Cage (Materials or Passenger), Excavator (and all attachments), Front End Loaders (1 1/2 yards and over), High Lift Lull and similar, Hoist (Single, Double, Triple Drum), Hoist Portable Mobile Unit, Hoist Engineer (Material), Jack and Bore Machine, Log Skidders, Mill Machines, Mucking Machines, Overhead Crane, Paver (concrete), Post Pounder (of any type), Push Cats, Road Reclaimer, Robot Hammer (Brokk or similar), Robotic Equipment (Scope of Engineer Schedule), Ross Carrier and similar, Scrapers (20 yard struck and over), Side Boom, Slip Form Machine, Spreader (Asphalt), Trenching Machines (Telephies-Vermeer Concrete Saw), Tractor Type Demolition Equipment, Vacuum Truck. Vibratory Roller(Riding) or Roller used in mainline paving operations.

GROUP I-B: Asphalt Mobile Conveyor/Transfer Machine, Road Paver (Asphalt).

GROUP II-A: Ballast Regulators, Compactor Self Propelled, Fusion Machine, Rail Anchor Machines, Roller (4 ton and over), Scrapers (20 yard struck and under).

GROUP II-B: Mechanic (Outside) All Types, Shop Mechanic.

GROUP III: Air Tractor Drill, Asphalt Plant, Batch Plant, Boiler (High Pressure), Concrete Breaker (Track or Rubber Tire), Concrete Pump, Concrete Spreader, Excavator Drill, Farm Tractor, Forklift (all types), Gas Tapping (Live), Hydroseeder, Loader (1 1/2 yards and under), Locomotive (all sizes), Machine Pulling Sheeps Foot Roller, Portable Asphalt Plant, Portable Batch Plant, Portable Crusher (Apprentice), Powerhouse Plant, Roller (under 4 ton), Sheer Excavator, Skid Steer/Bobcat, Stone Crusher, Sweeper (with seat), Well Drilling Machine.

GROUP IV: Service Person (Grease Truck), Deckhand.

GROUP IV-B: Conveyor Belt Machine (Truck Mounted), Heater (all types), Lighting Unit (Portable), Maintenance Engineer (For Crane Only), Mechanics Helper, Pump (Fireproofing), Pumps-Pump Station/Water/Sewer/Gypsum/Plaster, etc., Pump Truck (Sewer Jet or Similar), Welders Helper, Welding Machine (Steel Erection), Well Point System.

GROUP V: All Tower Cranes-All Climbing Cranes and all cranes of 100-ton capacity or greater (3900 Manitowac or similar) irrespective of manufacturer and regardless of how the same is rigged, Hoist Engineer (Steel), Engineer-Pile Driver, Jersey Spreader, Pavement Breaker/Post Hole Digger.

WAGES: Per hour:	07/01/2023	03/04/2024
Group I	\$ 67.27	\$ 68.63
Group I-A	59.26	60.42
Group I-B	62.46	63.70
Group II-A	56.74	57.84
Group II-B	58.52	59.67
Group III	55.74	56.81
Group IV	50.63	51.57
Group IV-B	43.43	44.19
Group V		
Engineer All Tower, Climbing and Cranes of 100 Tons	76.24	77.82

Hoist Engineer(Steel)	69.01	70.41
Engineer(Pile Driver)	73.61	75.13
Jersey Spreader, Pavement Breaker (Air Ram)Post Hole Digger	58.06	59.19

SHIFT DIFFERENTIAL:

A 15% premium on all hours paid, including overtime hours for 2nd, 3rd shifts on all government mandated off-shift work

Engineers operating cranes with booms 100 feet but less than 149 feet in length will be paid an additional \$2.00 per hour over the rate listed in the Wage Schedule. Engineers operating cranes with booms 149 feet or over in length will be paid an additional \$3.00 per hour over the rate listed in the Wage Schedule. Loader and Excavator Operators: over 5 cubic yards capacity \$0.50 per hour over the rate listed in the Wage Schedule. Shovel Operators: over 4 cubic yards capacity \$1.00 per hour over the rate listed in the Wage Schedule.

NOTE - The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30,2023 will expire within the granted time frame.

For Pre-Registered Projects 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. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker:	\$ 33.75 up to 40 Hours	\$ 34.85 up to 40 hours
	After 40 hours \$ 24.50* PLUS \$ 1.25 on all hours worked	After 40 hours \$ 25.55* PLUS \$ 1.25 on all hours worked

*This amount is subject to premium

OVERTIME PAY

See (B, E, P, *R, **U) on OVERTIME PAGE

HOLIDAY

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

Overtime..... See (5, 6, 8, 15, 25, 26) on OVERTIME PAGE

* For Holiday codes 8,15,25,26 code R applies

** For Holiday Codes 5 & 6 code U applies

Note: If employees are required to work on Easter Sunday they shall be paid at the rate of triple time.

REGISTERED APPRENTICES

(1)year terms at the following rate.

1st term	\$ 29.63	\$ 30.21
2nd term	35.56	36.25
3rd term	41.48	42.30
4th term	47.41	48.34
Supplemental Benefits per hour:		
	25.70	26.85

8-137HH

Operating Engineer - Heavy&Highway

02/01/2024

JOB DESCRIPTION Operating Engineer - Heavy&Highway

DISTRICT 1

ENTIRE COUNTIES

Albany, Broome, Chenango, Clinton, Columbia, Essex, Franklin, Fulton, Greene, Hamilton, Herkimer, Montgomery, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Tioga, Warren, Washington

PARTIAL COUNTIES

Dutchess: Defined as north of the northern boundary line of City of Poughkeepsie then due east to Route 115 to Bedell Road then east along Bedell Road to VanWagner Road then north along VanWagner Road to Bower Road then east along Bower Road to Rte. 44 east to Route 343 then along Route 343 east to the northern boundary of Town of Dover Plains and east along the northern boundary of Town of Dover Plains to Connecticut.

WAGES

CLASSIFICATION A1*: All Cranes

CLASSIFICATION A:

Asphalt Curb Machine (Self Propelled, Slipform), Asphalt Paver, Automated Concrete Spreader (CMI Type), Automatic Fine Grader, Backhoe (Except Tractor Mounted, Rubber Tired), Backhoe Excavator Full Swing (CAT 212 or similar type), Back Filling Machine, Belt Placer (CMI Type), Blacktop Plant (Automated), Blacktop Roller, Boom truck, GPS operated Bull Dozer, Cableway, Caisson Auger, Central Mix Concrete Plant (Automated), Concrete Curb Machine (Self Propelled, Slipform), Concrete Pump, Crane, Cherry Picker, Derricks (steel erection), Dragline, Overhead Crane (Gantry or Straddle type), Pile Driver, Truck Crane, Directional Drilling Machine, Dredge, Dual Drum Paver, Excavator (All PurposeHydraulically Operated) (Gradall or Similar), Front End Loader (4 cu. yd. and Over), Head Tower (Sauerman or Equal), Hoist (Two or Three Drum), Holland Loader, Maintenance Engineer, Mine Hoist, Mucking Machine or Mole, Pavement Breaker(SP) Wertgen; PB-4 and similar type, Power Grader, Profiler (over 105 H.P.), Quad 9, Quarry Master (or equivalent), Rotating Telehandler, Scraper (Including Challenger Type), Shovel, Side Boom, Slip Form Paver (If a second man is needed, he shall be an Oiler), Tractor Drawn BeltType Loader, Truck or Trailer Mounted Log Chipper (Self Feeder), Tug Operator (Manned Rented Equipment Excluded), Tunnel Shovel

CLASSIFICATION B:

Backhoe (Tractor Mounted, Rubber Tired), Bituminous Recycler Machine, Bituminous Spreader and Mixer, Blacktop Plant (NonAutomated), Blast or Rotary Drill (Truck or Tractor Mounted), Brokk, Boring Machine, Cage Hoist, Central Mix Plant [(NonAutomated) and All Concrete Batching Plants], Concrete Paver (Over 16S), Crawler Drill (Self-contained), Crusher, Diesel Power Unit, Drill Rigs, Tractor Mounted, Front End Loader (Under 4 cu. yd.), Greaseman/Lubrication Engineer, HiPressure Boiler (15 lbs. and over), Hoist (One Drum), Hydro-Axe, Kolman Plant Loader and Similar Type Loaders (If Employer requires another man to clean the screen or to maintain the equipment, he shall be an Oiler), L.C.M. Work Boat Operator, Locomotive, Material handling knuckle boom, Mini Excavator (under 18,000 lbs.), Mixer (for stabilized base self-propelled), Monorail Machine, Plant Engineer, Prentice Loader, Profiler (105 H.P. and under), Pug Mill, Pump Crete, Ready Mix Concrete Plant, Refrigeration Equipment (for soil stabilization), Road Widener, Roller (all above subgrade), Sea Mule, Self-contained Ride-on Rock Drill(Excluding Air-Track Type Drill), Skidder, Tractor with Dozer and/or Pusher, Trencher, Tugger Hoist, Vacuum machine (mounted or towed), Vermeer saw (ride on, any size or type), Welder, Winch, Winch Cat

CLASSIFICATION C:

A Frame Winch Hoist on Truck, Articulated Heavy Hauler, Aggregate Plant, Asphalt or Concrete Grooving Machine (ride on), Ballast Regulator(Ride-on), Boiler (used in conjunction with production), Bituminous Heater (self-propelled), Boat (powered), Cement and Bin Operator, Concrete Pavement Spreader and Finisher Concrete Paver or Mixer (16' and under), Concrete Saw (self-propelled), Conveyor, Deck Hand, Directional Drill Machine Locator, Drill (Core and Well), Farm Tractor with accessories, Fine Grade Machine, Fireman, Fork Lift, Form Tamper, Grout Pump, Gunit Machine, Hammers (Hydraulic self-propelled), Hydra-Spiker (ride-on), Hydraulic Pump (jacking system), Hydro-Blaster (Water), Mulching Machine, Oiler, Parapet Concrete or Pavement Grinder, Post Hole Digger and Post Driver, Power Broom (towed), Power Heaterman, Power Sweeper, Revinus Widener, Roller (Grade and Fill), Scarifier (ride-on), Shell Winder, Skid steer loader (Bobcat or similar; including all attachments), Span-Saw (ride-on), Steam Cleaner, Tamper (ride-on), Tie Extractor (ride-on), Tie Handler (ride-on), Tie Insertor (ride-on), Tie Spacer (ride-on), Tire Repair, Track Liner (ride-on), Tractor, Tractor (with towed accessories), Vibratory Compactor, Vibro Tamp, Well Point, and the following hands-off equipment: Compressors, Dust Collectors, Generators, Pumps, Welding Machines, Light Plants and Heaters

- Note for all above classifications of Operating Engineer - In the event that equipment listed above is operated by robotic control, the classification covering the operation will be the same as if manually operated.

WAGES per hour

	07/01/2023	07/01/2024
Class A1*	\$55.63	57.90
Class A	52.63	54.90
Class B	51.72	53.99
Class C	49.15	51.42

(*) TONNAGE RATING PREMIUMS:

Cranes over 1000 tons, A1 rate plus \$7.00

Cranes from 800-999 tons, A1 rate plus \$6.00

Cranes from 600-799 tons, A1 rate plus \$5.00

Cranes from 400-599 tons, A1 rate plus \$4.00

Cranes from 200-399 tons, A1 rate plus \$3.00

Cranes from 111-199 tons, A1 rate plus \$2.00

Cranes from 65-110 tons, A1 rate plus \$1.50

Cranes from 0-64 Tons, A1 rate only

NOTE: Additional value subject to same premiums as shown for OT

-- Tower Cranes, A1 rate plus \$3.00

-- Cranes in Luffer Configuration, A1 rate plus \$5.00

-- Cranes with external ballast (tray or wagon), A1 rate plus \$5.00

NOTE: Additional value subject to same premiums as shown for OT

Additional \$2.50 per hour for All Employees who work a single irregular work shift, of at least 5 consecutive days, starting from 5:00 PM to 1:00 AM that is mandated by the Contracting Agency.

Additional \$2.50 per hr. for hazardous waste removal work on State and/or Federally designated waste site which require employees to wear Level C or above forms of personal protection.

NOTE - The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30, 2023 will expire within the granted time frame.

For Pre-Registered Projects 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. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour

07/01/2023

07/01/2024

Journey person

\$ 31.50

\$ 32.60

OVERTIME PAY

See (B, E, Q) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 6) on HOLIDAY PAGE

Overtime: See (5, 6) on HOLIDAY PAGE

Note: If the holiday falls on Sunday, it will be observed on Monday. If the observed Monday Holiday is worked, pay shall be double time plus Holiday pay for time worked. If the Holiday falls on a Saturday and is worked pay shall be double time plus Holiday pay for time worked. If the Holiday falls on a Saturday employer can choose to observe the paid holiday Saturday or give Friday off with holiday pay.

REGISTERED APPRENTICES

Wages per hour

1000 hours terms at the following percentage of Journey person's wage Class B

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

Supplemental Benefits per hour worked

07/01/2023

07/01/2024

All Terms

\$ 26.25

\$27.10

1-158H/H Alb

Operating Engineer - Heavy&Highway

02/01/2024

JOB DESCRIPTION Operating Engineer - Heavy&Highway

DISTRICT 9

ENTIRE COUNTIES

Putnam, Westchester

PARTIAL COUNTIES

Dutchess: South of the North city line of Poughkeepsie

WAGES

Party Chief - One who directs a survey party

Instrument Man - One who runs the instrument and assists Party Chief

Rodman - One who holds the rod and in general, assists the Survey Crew

Categories cover GPS & Underground Surveying

Per Hour:

07/01/2023

Party Chief

\$ 81.72

Instrument Man

61.43

Rodman

52.40

SUPPLEMENTAL BENEFITS

Per Hour:

07/01/2023

All Categories

Straight Time:

\$ 25.25* + \$7.64

Premium:

Time & 1/2 \$ 37.88* + \$7.64

Double Time \$ 50.50* + \$7.64

Non-Worked Holiday Supplemental Benefits:
\$ 21.19

OVERTIME PAY

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

* Doubletime paid on all hours in excess of 8 hours on Saturday

HOLIDAY

Paid: See (5, 6, 7, 11, 12) on HOLIDAY PAGE

Overtime: See (5, 6, 7, 11, 12) on HOLIDAY PAGE

9-15Dh

Operating Engineer - Heavy&Highway - Tunnel

02/01/2024

JOB DESCRIPTION Operating Engineer - Heavy&Highway - Tunnel

DISTRICT 8

ENTIRE COUNTIES

Putnam, Westchester

PARTIAL COUNTIES

Dutchess: All the counties of Westchester and Putnam and the southern part of Dutchess County defined by the northern boundary line of the City of Poughkeepsie, then due east to Route 115, then north along Route 115 to Bedell Road, then east along Bedell Road to Van Wagner Road, then north along Van Wagner Road to Bower Road, then east along Bower Road to Route 44 and along Route 44 east to Route 343, then along Route 343 east to the northern boundary of Town of Dover Plains and east along the northern boundary of Town of Dover Plains to the border line of the State of Connecticut and bordered on the west by the middle of the Hudson River.

WAGES

GROUP I: Boom Truck, Cherry Picker, Clamshell, Crane(Crawler, Truck), Dragline, Drill Rig Casa Grande(Cat or Similar), Floating Crane(Crane on Barge-Under 100 Tons), Hoist Engineer(Concrete/Crane-Derrick-Mine Hoist), Knuckle Boom Crane, Rough Terrain Crane.

GROUP I-A: Auger(Truck or Truck Mounted), Boat Captain, Bull Dozer-all sizes, Central Mix Plant Operator, Chipper-all types, Close Circuit T.V., Combination Loader/Backhoe, Compactor with Blade, Concrete Finishing Machine, Gradall, Grader(Motor Grader), Elevator & Cage(Materials or Passengers), Excavator(and all attachments), Front End Loaders(1 1/2 yards and over), High Lift Lull, Hoist(Single, Double, Triple Drum), Hoist Portable Mobile Unit, Hoist Engineer(Material), Jack and Bore Machine, Log Skidder, Milling Machine, Moveable Concrete Barrier Transfer & Transport Vehicle, Mucking Machines. Overhead Crane, Paver(Concrete), Post Pounder of any type, Push Cats, Road Reclaimer, Robot Hammer(Brokk or similar), Robotic Equipment(Scope of Engineer Schedule), Ross Carrier and similar machines, Scrapers(20 yards struck and over), Side Boom, Slip Form Machine, Spreader(Asphalt), Trenching Machines, Telephies-Vermeer Concrete Saw, Tractor type demolition equipment, Vacuum Truck, Vibratory Roller (Riding) used in mainline paving operations.

GROUP I-B: Asphalt Mobile Conveyor/Transfer Machine, Road Paver(Asphalt).

GROUP II-A: Ballast Regulators, Compactor(Self-propelled), Fusion Machine, Rail Anchor Machines, Roller(4 ton and over), Scrapers(20 yard struck and under).

GROUP II-B: Mechanic(outside)all types, Shop Mechanic.

GROUP III: Air Tractor Drill, Asphalt Plant, Batch Plant, Boiler(High Pressure), Concrete Breaker(Track or Rubber Tire), Concrete Pump, Concrete Spreader, Excavator Drill, Farm Tractor, Forklift(all types of power), Gas Tapping(Live), Hydroseeder, Loader(1 1/2 yards and under), Locomotive(all sizes), Machine Pulling Sheeps Foot Roller, Portable Asphalt Plant, Portable Batch Plant, Portable Crusher(Apprentice), Powerhouse Plant, Roller(under 4 ton), Sheer Excavator, Skidsteer/Bobcat, Stone Crusher, Sweeper(with seat), Well Drilling Machine.

GROUP IV-A: Service Person(Grease Truck), Deckhand.

GROUP IV-B: Conveyor Belt Machine(Truck Mounted), Heater(all types), Lighting Unit(Portable), Maintenance Engineer(for Crane only), Mechanics Helper, Pump(Fireproofing), Pumps-Pump Station/Water/Sewer/Gypsum/Plaster, etc., Pump Truck(Sewer Jet or similar), Welding Machine(Steel Erection), Welders Helper.

GROUP V-A: Engineer(all Tower Cranes, all Climbing Cranes & all Cranes of 100 ton capacity or greater),Hoist Engineer(Steel-Sub Structure), Engineer-Pile Driver, Jersey-Spreader, Pavement breaker, Post Hole Digger

WAGES: (per hour)

	07/01/2023	03/04/2024
GROUP I	\$ 67.27	\$ 68.63
GROUP I-A	59.26	60.42
GROUP I-B	62.46	63.70
GROUP II-A	56.74	57.84

GROUP II-B	58.52	59.67
GROUP III	55.74	56.81
GROUP IV-A	50.63	51.57
GROUP IV-B	43.43	44.19
GROUP V-A		
Engineer-Cranes	76.24	77.82
Engineer-Pile Driver	73.61	75.13
Hoist Engineer	69.01	70.41
Jersey Spreader/Post		
Hole Digger	58.06	59.19

SHIFT DIFFERENTIAL:

A 15% premium on all hours paid, including overtime hours for 2nd, 3rd shifts
on all government mandated off-shift work

An additional 20% to wage when required to wear protective equipment on hazardous/toxic waste projects. Operators required to use two buckets pouring concrete on other than road pavement shall receive \$0.50 per hour over scale. Engineers operating cranes with booms 100 feet but less than 149 feet in length will be paid an additional \$2.00 per hour. Engineers operating cranes with booms 149 feet or over in length will be paid an additional \$3.00 per hour. Operators of shovels with a capacity over (4) cubic yards shall be paid an additional \$1.00 per hour. Operators of loaders with a capacity over (5) cubic yards shall be paid an additional \$0.50 per hour.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker:

\$ 33.75 up to	\$ 34.85 up to
40 hours	40 hours
After 40 hours	After 40 hours
\$24.50 plus	\$25.55 plus
\$1.25 on all	\$1.25 on all
hours worked	hours worked

OVERTIME PAY

See (D, O, *U, V) on OVERTIME PAGE

HOLIDAY

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

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

* Note: For Holiday codes 5 & 6, code U applies. For Holiday codes 8, 15, 25, 26, code R applies.

Note: If employees are required to work on Easter Sunday, they shall be paid at the rate of triple time.

REGISTERED APPRENTICES

(1)year terms at the following rates:

1st term	\$ 29.63	\$ 30.21
2nd term	35.56	36.25
3rd term	41.48	42.30
4th term	47.41	48.34

Supplemental Benefits per hour:

All terms	\$ 25.70	\$ 26.85
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8-137Tun

Operating Engineer - Marine Dredging

02/01/2024

JOB DESCRIPTION Operating Engineer - Marine Dredging

DISTRICT 4

ENTIRE COUNTIES

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

WAGES

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

Per Hour:	07/01/2023	10/01/2023
CLASS A1	\$ 43.94	\$ 45.26
Deck Captain, Leverman		
Mechanical Dredge Operator		

Licensed Tug Operator 1000HP or more.

CLASS A2	39.16	40.33
Crane Operator (360 swing)		

CLASS B	To conform to Operating Engineer	
Dozer, Front Loader	Prevailing Wage in locality where work	
Operator on Land	is being performed including benefits.	

CLASS B1	38.00	39.14
Derrick Operator (180 swing)		
Spider/Spill Barge Operator		
Operator II, Fill Placer,		
Engineer, Chief Mate, Electrician,		
Chief Welder, Maintenance Engineer		
Licensed Boat, Crew Boat Operator		

CLASS B2	35.77	36.84
Certified Welder		

CLASS C1	34.79	35.83
Drag Barge Operator,		
Steward, Mate,		
Assistant Fill Placer		

CLASS C2	33.67	34.68
Boat Operator		

CLASS D	27.97	28.81
Shoreman, Deckhand, Oiler,		
Rodman, Scowman, Cook,		
Messman, Porter/Janitor		

SUPPLEMENTAL BENEFITS

Per Hour:

THE FOLLOWING SUPPLEMENTAL BENEFITS APPLY TO ALL CATEGORIES

All Classes A & B	\$ 11.85 plus 6% of straight time wage, Overtime hours add \$ 0.63	\$ 12.00 plus 6% of straight time wage, Overtime hours add \$ 0.63
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All Class C	\$ 11.60 plus 6% of straight time wage, Overtime hours add \$ 0.50	\$ 11.75 plus 6% of straight time wage, Overtime hours add \$ 0.50
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All Class D	\$ 11.35 plus 6% of straight time wage, Overtime hours add \$ 0.38	\$ 11.60 plus 6% of straight time wage, Overtime hours add \$ 0.50
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OVERTIME PAY

See (B2, F, R) on OVERTIME PAGE

HOLIDAY

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

4-25a-MarDredge

Operating Engineer - Survey Crew

02/01/2024

JOB DESCRIPTION Operating Engineer - Survey Crew
ENTIRE COUNTIES

DISTRICT 12

Albany, Allegany, Broome, Cayuga, Chemung, Chenango, Clinton, Columbia, Cortland, Essex, Franklin, Fulton, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Oneida, Onondaga, Ontario, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Warren, Washington, Wayne, Yates

PARTIAL COUNTIES

Dutchess: The northern portion of the county from the northern boundary line of the City of Poughkeepsie, north.

Genesee: Only the portion of the county that lies east of a line down the center of Route 98 to include all area that lies within the City of Batavia.

WAGES

These rates apply to Building, Tunnel and Heavy Highway.

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.

07/01/2023

Party Chief	\$ 48.97
Instrument Person	44.99
Rod Person	33.37

Additional \$3.00/hr. for Tunnel Work

Additional \$2.50/hr. for Hazardous Work Site

SUPPLEMENTAL BENEFITS

Per hour worked:

Journeyman	\$ 28.90
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OVERTIME PAY

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

*Note: \$24.60/Hr. Only for "ALL" premium hours paid 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 Persons Wage:

07/01/2023

0-1000	60%
1001-2000	70%
2001-3000	80%

SUPPLEMENTAL BENEFIT per hour worked:

0-1000	\$ 20.68 / PHP \$17.53
1001-2000	23.70 / " 19.95
2001-3000	26.73 / " 22.43

NOTE: PHP is premium hours paid when worked.

12-158-545 D.H.H.

Operating Engineer - Survey Crew - Consulting Engineer

02/01/2024

JOB DESCRIPTION Operating Engineer - Survey Crew - Consulting Engineer

DISTRICT 12

ENTIRE COUNTIES

Albany, Allegany, Broome, Cayuga, Chemung, Chenango, Clinton, Columbia, Cortland, Essex, Franklin, Fulton, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Oneida, Onondaga, Ontario, Oswego, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Warren, Washington, Wayne, Yates

PARTIAL COUNTIES

Dutchess: The northern portion of the county from the northern boundary line of the City of Poughkeepsie, north.

Genesee: Only the portion of the county that lies east of a line down the center of Route 98 to include all area that lies within the City of Batavia.

WAGES

These rates apply to feasibility and preliminary design surveying, line and 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.

07/01/2023

Party Chief	\$ 48.97
Instrument Person	44.99
Rod Person	33.37

Additional \$3.00/hr. for Tunnel Work.

Additional \$2.50/hr. for EPA or DEC certified toxic or hazardous waste work.

SUPPLEMENTAL BENEFITS

Per hour worked:

Journeyman	\$ 28.90
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OVERTIME PAY

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

*Note: \$24.10/Hr. Only for "ALL" premium hours paid 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 percentage of Rod Persons Wage:

07/01/2023

0-1000	60%
1001-2000	70%
2001-3000	80%

SUPPLEMENTAL BENEFIT per hour worked:

0-1000	\$ 20.68 / PHP \$17.53
1001-2000	\$ 23.70 / " 19.95
2001-3000	\$ 26.73 / " 22.43

NOTE: PHP is premium hours paid when worked.

12-158-545 DCE

Operating Engineer - Survey Crew - Consulting Engineer

02/01/2024

JOB DESCRIPTION Operating Engineer - Survey Crew - Consulting Engineer

DISTRICT 9

ENTIRE COUNTIES

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

PARTIAL COUNTIES

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

WAGES

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

Per hour:

07/01/2023

Survey Classifications

Party Chief	\$ 47.15
Instrument Man	39.30
Rodman	34.35

SUPPLEMENTAL BENEFITS

Per Hour:

All Crew Members:	\$ 23.15
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OVERTIME PAY

OVERTIME:.... See (B, E*, Q, V) ON OVERTIME PAGE.

*Double-time paid on the 9th hour on Saturday.

HOLIDAY

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

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

9-15dconsult

Operating Engineer - Tunnel

02/01/2024

JOB DESCRIPTION Operating Engineer - Tunnel

DISTRICT 7

ENTIRE COUNTIES

Albany, Allegany, Broome, Cayuga, Chemung, Chenango, Clinton, Columbia, Cortland, Essex, Franklin, Fulton, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Oneida, Onondaga, Ontario, Oswego, Otsego, Rensselaer, Saratoga, Schoenectady, Schoharie, Schuyler, Seneca, St. Lawrence, Steuben, Tioga, Tompkins, Warren, Washington, Wayne, Yates

PARTIAL COUNTIES

Dutchess: Northern part of Dutchess, to the northern boundary line of the City of Poughkeepie, then due east to Route 115 to Bedell Road, then east along Bedell Road to VanWagner Road, then north along VanWagner Road to Bower Road, then east along Bower Road to Rte. 44 east to Rte. 343, then along Rte. 343 east to the northern boundary of the Town of Dover Plains and east along the northern boundary of the Town of Dover Plains, to the borderline of the State of Connecticut.

Genesee: Only that portion of the county that lies east of a line drawn down the center of Route 98 and the entirety of the City of Batavia.

WAGES

CLASS A: Automatic Concrete Spreader (CMI Type); Automatic Fine Grader; Backhoe (except tractor mounted, rubber tired); Belt Placer (CMI Type); Blacktop Plant (automated); Cableway; Caisson Auger; Central Mix Concrete Plant (automated); Concrete Curb Machine (self-propelled slipform); Concrete Pump (8" or over); Dredge; Dual Drum Paver; Excavator; Front End Loader (4 cu. yd & over); Gradall; Head Tower (Sauerman or Equal); Hoist (shaft); Hoist (two or three Drum); Log Chipper/Loader (self-feeder); Maintenance Engineer (shaft and tunnel); any Mechanical Shaft Drill; Mine Hoist; Mining Machine(Mole and similar types); Mucking Machine or Mole; Overhead Crane (Gantry or Straddle Type); Pile Driver; Power Grader; Remote Controlled Mole or Tunnel Machine; Scraper; Shovel; Side Boom; Slip Form Paver (If a second man is needed, they shall be an Oiler); Tripper/Maintenance Engineer (shaft & tunnel); Tractor Drawn Belt-Type Loader; Tug Operator (manned rented equipment excluded); Tunnel Shovel.

CLASS B: Automated Central Mix Concrete Plant; Backhoe (topside); Backhoe (track mounted, rubber tired); Backhoe (topside); Bituminous Spreader and Mixer, Blacktop Plant (non-automated); Blast or Rotary Drill (truck or tractor mounted); Boring Machine; Cage Hoist; Central Mix Plant(non-automated); all Concrete Batching Plants; Compressors (4 or less exceeding 2,000 c.f.m. combined capacity); Concrete Pump; Crusher; Diesel Power Unit; Drill Rigs (tractor mounted); Front End Loader (under 4 cu. yd.); Grayco Epoxy Machine; Hoist (One Drum); Hoist (2 or 3 drum topside); Knuckle Boom material handler; Kolman Plant Loader & similar type Loaders (if employer requires another person to clean the screen or to maintain the equipment, they shall be an Oiler); L.C.M. Work Boat Operator; Locomotive; Maintenance Engineer (topside); Maintenance Grease Man; Mixer (for stabilized base-self-propelled); Monorail Machine; Plant Engineer; Personnel Hoist; Pump Crete; Ready Mix Concrete Plant; Refrigeration Equipment (for soil stabilization); Road Widener; Roller (all above sub-grade); Sea Mule; Shotcrete Machine; Shovel (topside); Tractor with Dozer and/or Pusher; Trencher; Tugger Hoist; Tunnel Locomotive; Vacuum Machine (mounted or towed); Welder; Winch; Winch Cat.

CLASS C: A Frame Truck; All Terrain Telescoping Material Handler; Ballast Regulator (ride-on); Compressors (4 not to exceed 2,000 c.f.m. combined capacity; or 3 or less with more than 1200 c.f.m. but not to exceed 2,000 c.f.m.); Compressors ((any size, but subject to other provisions for compressors), Dust Collectors, Generators, Pumps, Welding Machines, Light Plants (4 or any type combination)); Concrete Pavement Spreaders and Finishers; Conveyor; Drill (core); Drill (well); Electric Pump used in conjunction with Well Point System; Farm Tractor with Accessories; Fine Grade Machine; Fork Lift; Grout Pump (over 5 cu. ft.); Guniting Machine; Hammers (hydraulic-self-propelled); Hydra-Spiker (ride-on); Hydra-Blaster (water); Hydro-Blaster; Motorized Form Carrier; Post Hole Digger and Post Driver; Power Sweeper; Roller grade & fill); Scarifier (ride-on); Span-Saw (ride-on); Submersible Electric Pump (when used in lieu of well points); Tamper (ride-on); Tie-Extractor (ride-on), Tie Handler (ride-on), Tie Insertor (ride-on), Tie Spacer (ride-on); Track Liner (ride-on); Tractor with towed accessories; Vibratory Compactor; Vibro Tamp, Well Point.

CLASS D: Aggregate Plant; Cement & Bin Operator; Compressors (3 or less not to exceed 1,200 c.f.m. combined capacity); Compressors ((any size, but subject to other provisions for compressors), Dust Collectors, Generators, Pumps, Welding Machines, Light Plants (3 or less or any type or combination)); Concrete Saw (self-propelled); Form Tamper; Greaseman; Hydraulic Pump (jacking system); Junior Engineer; Light Plants; Mulching Machine; Oiler; Parapet Concrete or Pavement Grinder; Power Broom (towed); Power Heaterman (when used for production); Reviniis Widener; Shell Winder; Steam Cleaner; Tractor.

Per hour:	07/01/2023	07/01/2024	07/01/2025
CLASS A	\$ 53.52	\$ 55.91	\$ 58.44
CLASS B	52.30	54.69	57.22
CLASS C	49.51	51.90	54.43
CLASS D	46.50	48.89	51.42

Additional \$5.00 per hour for Hazardous Waste Work on a state or federally designated hazardous waste site where the Operating Engineer is in direct contact with hazardous material and when personal protective equipment is required for respiratory, skin and eye protection. Fringe benefits will be paid at the hourly wage premium.

CRANES:
Crane 1: All cranes, including self-erecting.
Crane 2: All Lattice Boom Cranes and all cranes with a manufacturer's rating of fifty (50) ton and over.
Crane 3: All hydraulic cranes and derricks with a manufacturer's rating of forty nine (49) ton and below, including boom trucks.

Crane 1	\$ 57.52	\$ 59.91	\$ 62.44
Crane 2	56.52	58.91	61.44
Crane 3	55.52	57.91	60.44

SUPPLEMENTAL BENEFITS

Per hour:	\$ 24.20	\$ 25.05	\$ 25.90
	+ 9.60*	+ 9.85*	+ 10.10*

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

OVERTIME PAY
See (B, B2, E, Q, X) on OVERTIME PAGE

HOLIDAY
Paid: See (5, 6) on HOLIDAY PAGE
Overtime: See (5, 6) on HOLIDAY PAGE
If a holiday falls on Sunday, it shall be observed on Monday.

REGISTERED APPRENTICES
WAGES:(1000) hours terms at the following percentage of Journeyman's Class B wage.

1st term	60%
2nd term	65%
3rd term	70%
4th term	75%

SUPPLEMENTAL BENEFITS per hour: Same as Journeyman.

7-158-832TL.

Painter

02/01/2024

JOB DESCRIPTION PainterDISTRICT 1

ENTIRE COUNTIES
Columbia, Dutchess, Greene, Orange, Sullivan, Ulster

WAGES		
Per hour	07/01/2023	07/01/2024 Additional

Brush/Paper Hanger	\$ 37.97	+ \$1.93*
Dry Wall Finisher	37.97	+ \$1.93*
Lead Abatement	37.97	+ \$1.93*
Sandblaster-Painter	37.97	+ \$1.93*
Spray Rate	38.97	+ \$1.93*

(*) To be allocated at later date.

See Bridge Painting rates for the following work:
Structural Steel, all work performed on tanks, ALL BRIDGES, towers, smoke stacks, flag poles. Rate shall apply to all of said areas from the ground up.

SUPPLEMENTAL BENEFITS
Per hour

Journeyperson	\$ 26.28
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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

Six (6) month terms at the following percentage of Journeyperson's wage

1st	2nd	3rd	4th	5th	6th
50%	55%	65%	75%	85%	95%

Supplemental Benefits per hour worked

1st term	\$ 11.14
All others	26.28

1-155

Painter - Bridge & Structural Steel

02/01/2024

JOB DESCRIPTION Painter - Bridge & Structural Steel

DISTRICT 8

ENTIRE COUNTIES

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

WAGES

Per Hour:

STEEL:

Bridge Painting:	07/01/2023	10/01/2023
	\$ 54.50	\$ 56.00
	+ 10.10*	+ 10.35*

ADDITIONAL \$6.50 per hour for POWER TOOL/SPRAY, whether straight time or overtime.

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

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

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

SHIFT WORK:

When directly specified in public agency or authority contract documents for an employer to work a second shift and works the second shift with employees other than from the first shift, all employees who work the second shift will be paid 10% of the base wage shift differential in lieu of overtime for the first eight (8) hours worked after which the employees shall be paid at time and one half of the regular wage rate. When a single irregular work shift is mandated in the job specifications or by the contracting agency, wages shall be paid at time and one half for single shifts between the hours of 3pm-11pm or 11pm-7am.

SUPPLEMENTAL BENEFITS

Per Hour:

Journeyworker:	\$ 11.78	\$ 12.43
	+ 30.85*	+ 31.55*

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

OVERTIME PAY

See (B, F, R) on OVERTIME PAGE

HOLIDAY

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

REGISTERED APPRENTICES

Wage - Per hour:

Apprentices: (1) year terms.

1st year	\$ 21.80	\$ 22.40
	+ 4.04	+ 4.14
2nd year	\$ 32.70	\$ 33.60
	+ 6.06	+ 6.21

3rd year	\$ 43.60 + 8.08	\$ 44.80 + 8.28
Supplemental Benefits - Per hour:		
1st year	\$.90 + 12.34	\$ 1.16 + 12.62
2nd year	\$ 7.07 + 18.51	\$ 7.46 + 18.93
3rd year	\$ 9.42 + 24.68	\$ 9.94 + 25.24

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

8-DC-9/806/155-BrSS

Painter - Line Striping	02/01/2024
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JOB DESCRIPTION Painter - Line Striping

DISTRICT 8

ENTIRE COUNTIES

Albany, Clinton, Columbia, Dutchess, Essex, Franklin, Fulton, Greene, Hamilton, Montgomery, Nassau, Orange, Putnam, Rensselaer, Rockland, Saratoga, Schenectady, Schoharie, Suffolk, Sullivan, Ulster, Warren, Washington, Westchester

WAGES

Per hour:

Painter (Striping-Highway):	07/01/2023	01/01/2024	07/01/2024
Striping-Machine Operator*	\$ 31.53	\$ 31.53	\$ 34.12
Linerman Thermoplastic	38.34	38.34	41.12

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

NOTE - The "Employer Registration" (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30,2023 will expire within the granted time frame.

For Pre-Registered Projects 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. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour paid:

Journeyworker:			
Striping Machine Operator:	\$ 10.03	\$ 22.24	\$ 23.65
Linerman Thermoplastic:	10.03	22.24	23.65

OVERTIME PAY

See (B, B2, E2, F, S) on OVERTIME PAGE

HOLIDAY

Paid: See (5, 20) on HOLIDAY PAGE
Overtime: See (5, 20) on HOLIDAY PAGE

REGISTERED APPRENTICES

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

1st Term:	\$ 15.00	\$ 15.00	\$ 15.00
2nd Term:	18.92	18.92	20.47
3rd Term:	25.22	25.22	27.30

Supplemental Benefits per hour:

1st term:	\$ 9.16	\$ 22.24	\$ 23.65
2nd Term:	10.03	22.24	23.65
3rd Term:	10.03	22.24	23.65

8-1456-LS

Painter - Metal Polisher**02/01/2024**

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, Schuylar, Seneca, St. Lawrence, Steuben, Suffolk, Sullivan, Tioga, Tompkins, Ulster, Warren, Washington, Wayne, Westchester, Wyoming, Yates

WAGES

07/01/2023

Metal Polisher	\$ 38.18
Metal Polisher*	39.28
Metal Polisher**	42.18

*Note: Applies on New Construction & complete renovation

** Note: Applies when working on scaffolds over 34 feet.

SUPPLEMENTAL BENEFITS

Per Hour: 07/01/2023

Journeyworker:

All classification \$ 12.34

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, 11, 15, 16, 25, 26) on HOLIDAY PAGE

REGISTERED APPRENTICES

Wages per hour:

One (1) year term at the following wage rates:

07/01/2023

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	\$ 8.69
2nd year	8.69
3rd year	8.69

8-8A/28A-MP

Plumber**02/01/2024**

JOB DESCRIPTION Plumber**DISTRICT 8****ENTIRE COUNTIES**

Dutchess

PARTIAL COUNTIES

Delaware: Only the Townships of Middletown and Roxbury.

Ulster: Entire county (including Walkill and Shawangunk Prisons in Town of Shawangunk) EXCEPT for remainder of Town of Shawangunk, and Towns of Plattekill, Marlboro, and Wawarsing.

WAGES

Per hour: 07/01/2023
Plumber &
Steamfitter \$ 57.08

SHIFT WORK:

When directly specified in public agency or authority contract documents, shift work outside the regular hours of work shall be comprised of eight (8) hours per shift not including Saturday, Sundays and holidays. One half (1/2) hour shall be allowed for lunch after the first four (4) hours of each shift. Wage and Fringes for shift work shall be straight time plus a shift premium of twenty-five (25%) percent. A minimum of five days Monday through Friday must be worked to establish shift work.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker: \$ 42.38

OVERTIME PAY

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

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

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

REGISTERED APPRENTICES

(1)year terms at the following rates:

07/01/2023

1st year	\$ 21.80
2nd year	30.11
3rd year	34.93
4th year	41.89
5th year	48.24

Supplemental Benefits per hour:

1st year	\$ 17.95
2nd year	22.96
3rd year	26.66
4th year	30.82
5th year	33.99

8-21.2-SF

Plumber - HVAC / Service

02/01/2024

JOB DESCRIPTION Plumber - HVAC / Service

DISTRICT 8

ENTIRE COUNTIES

Dutchess, Putnam, Westchester

PARTIAL COUNTIES

Delaware: Only the townships of Middletown and Roxbury

Ulster: Entire County(including Wallkill and Shawangunk Prisons) except for remainder of Town of Shawangunk and Towns of Plattekill, Marlboro, and Wawarsing.

WAGES

Per hour: 07/01/2023

HVAC Service \$ 42.68
+ \$ 4.37*

*Note: This portion of wage is not subject to overtime premium.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker HVAC Service
\$ 28.99

OVERTIME PAY

See (B, F, R) on OVERTIME PAGE

HOLIDAY

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

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

REGISTERED APPRENTICES

HVAC SERVICE

(1)year terms at the following wages:

1st yr.	2nd yr.	3rd yr.	4th yr.	5th yr.
\$ 19.32	\$ 22.91	\$ 28.56	\$ 35.13	\$ 38.15
+\$2.39*	+\$2.70*	+\$3.25*	+\$3.88*	+\$4.12*

*Note: This portion of wage is not subject to overtime premium.

Supplemental Benefits per hour:

Apprentices 07/01/2023

1st term	\$ 20.84
2nd term	22.28
3rd term	23.85
4th term	26.01
5th term	27.55

8-21.1&2-SF/Re/AC

Plumber - Jobbing & Alterations

02/01/2024

JOB DESCRIPTION Plumber - Jobbing & Alterations

DISTRICT 8

ENTIRE COUNTIES

Dutchess, Putnam, Westchester

PARTIAL COUNTIES

Ulster: Entire county (including Wallkill and Shawangunk Prisons in Town of Shawangunk) EXCEPT for remainder of Town of Shawangunk, and Towns of Plattekill, Marlboro, and Wawarsing.

WAGES

Per hour:	07/01/2023
Journeyworker:	\$ 48.51

Repairs, replacements and alteration work is any repair or replacement of a present plumbing system that does not change existing roughing or water supply lines.

SHIFT WORK:

When directly specified in public agency or authority contract documents, shift work outside the regular hours of work shall be comprised of eight (8) hours per shift not including Saturday, Sundays and holidays. One half (1/2) hour shall be allowed for lunch after the first four (4) hours of each shift. Wage and Fringes for shift work shall be straight time plus a shift premium of twenty-five (25%) percent. A minimum of five days Monday through Friday must be worked to establish shift work.

SUPPLEMENTAL BENEFITS

Per hour:

Journeyworker	\$ 34.76
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OVERTIME PAY

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

*When used as a make-up day, hours after 8 on Saturday shall be paid at time and one half.

HOLIDAY

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

REGISTERED APPRENTICES

(1) year terms at the following wages:

1st year	\$ 20.92
2nd year	23.24
3rd year	25.29
4th year	35.48
5th year	37.49

Supplemental Benefits per hour:

1st year	\$ 11.45
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2nd year	13.46
3rd year	17.51
4th year	23.67
5th year	25.68

8-21.3-J&A

Roofer

02/01/2024

JOB DESCRIPTION Roofer

DISTRICT 9

ENTIRE COUNTIES

Bronx, Dutchess, Kings, New York, Orange, Putnam, Queens, Richmond, Rockland, Sullivan, Ulster, Westchester

WAGES

Per Hour:	07/01/2023	05/01/2024
		Additional
Roofer/Waterproofeer	\$ 46.50	\$2.50
	+ \$7.00*	

* This portion is not subjected to overtime premiums.

Note: Abatement/Removal of Asbestos containing roofs and roofing material is classified as Roofer.

SUPPLEMENTAL BENEFITS

Per Hour:	\$ 31.37
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OVERTIME PAY

See (B, H) on OVERTIME PAGE

Note: An observed holiday that falls on a Sunday will be observed the following Monday.

HOLIDAY

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

REGISTERED APPRENTICES

(1) year term apprentices indentured prior to 01/01/2023

	1st	2nd	3rd	4th
	\$ 16.28	\$ 23.25	\$ 27.90	\$ 34.88
		+ 3.50*	+ 4.20*	+ 5.26*
Supplements:				
	1st	2nd	3rd	4th
	\$ 4.03	\$ 15.85	\$ 18.95	\$ 23.61

* This portion is not subjected to overtime premiums.

(1) year term apprentices indentured after 01/01/2023

	1st	2nd	3rd	4th	5th
	\$ 17.67	\$ 20.93	\$ 23.25	\$ 27.90	\$ 34.88
		+ 3.16*	+ 3.50*	+ 4.20*	+ 5.26
Supplements:					
	1st	2nd	3rd	4th	5th
	\$ 7.61	\$ 14.29	\$ 15.85	\$ 18.95	\$ 23.61

* This portion is not subjected to overtime premiums.

9-8R

Sheetmetal Worker

02/01/2024

JOB DESCRIPTION Sheetmetal Worker

DISTRICT 8

ENTIRE COUNTIES

Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, Westchester

WAGES

	07/01/2023
SheetMetal Worker	\$ 47.00
	+ 3.60*

*This portion is not subject to overtime premiums.

SHIFT WORK

For all NYS D.O.T. and other Governmental mandated off-shift work:
10% increase for additional shifts for a minimum of five (5) days

SUPPLEMENTAL BENEFITS

Journeyworker \$ 45.62

OVERTIME PAY

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

HOLIDAY

Paid: See (1) on HOLIDAY PAGE

Overtime: See (5, 6, 8, 15, 16, 23) on HOLIDAY PAGE

REGISTERED APPRENTICES

1st	2nd	3rd	4th	5th	6th	7th	8th
\$ 17.50	\$ 19.67	\$ 21.87	\$ 24.05	\$ 26.24	\$ 28.44	\$ 31.10	\$ 33.75
+ 1.44*	+ 1.62*	+ 1.80*	+ 1.98*	+ 2.16*	+ 2.34*	+ 2.52*	+ 2.70*

*This portion is not subject to overtime premiums.

Supplemental Benefits per hour:

Apprentices

1st term	\$ 19.53
2nd term	21.99
3rd term	24.42
4th term	26.88
5th term	29.32
6th term	31.75
7th term	33.72
8th term	35.71

8-38

Sprinkler Fitter

02/01/2024

JOB DESCRIPTION Sprinkler Fitter

DISTRICT 1

ENTIRE COUNTIES

Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, Westchester

WAGES

Per hour 07/01/2023

Sprinkler \$ 50.86
Fitter

SUPPLEMENTAL BENEFITS

Per hour

Journeyperson \$ 30.19

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
\$ 24.77	\$ 27.53	\$ 30.03	\$ 32.78	\$ 35.53	\$ 38.29	\$ 41.04	\$ 43.79	\$ 46.54	\$ 49.30

Supplemental Benefits per hour

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
\$ 8.74	\$ 8.74	\$ 20.32	\$ 20.32	\$ 20.57	\$ 20.57	\$ 20.57	\$ 20.57	\$ 20.57	\$ 20.57
									1-669.2

Teamster - Building / Heavy&Highway

02/01/2024

JOB DESCRIPTION Teamster - Building / Heavy&Highway

DISTRICT 11

ENTIRE COUNTIES

Dutchess, Orange, Rockland, Sullivan, Ulster

WAGES

GROUP 1: LeTourneau Tractors, Double Barrel Euclids, Athney Wagons and similar equipment (except when hooked to scrapers), I-Beam and Pole Trailers, Tire Trucks, Tractor and Trailers with 5 axles and over, Articulated Back Dumps and Road Oil Distributors, Articulated Water Trucks and Fuel Trucks/Trailers, positions requiring a HAZMAT CDL endorsement.

GROUP 1A: Drivers on detachable Gooseneck Low Bed Trailers rated over 35 tons.

GROUP 2: All equipment 25 yards and up to and including 30 yard bodies and cable Dump Trailers and Powder and Dynamite Trucks.

GROUP 3: All Equipment up to and including 24-yard bodies, Mixer Trucks, Dump Crete Trucks and similar types of equipment, Fuel Trucks, Batch Trucks and all other Tractor Trailers, Hi-Rail Truck.

GROUP 4: Tri-Axles, Ten Wheelers, Grease Trucks, Tillerman, Pattern Trucks, Attenuator Trucks, Water Trucks, Bus.

GROUP 5: Straight Trucks.

GROUP 6: Pick-up Trucks for hauling materials and parts, and Escort Man over-the-road.

WAGES: (per hour) 07/01/2023

GROUP 1	\$ 34.58
GROUP 1A	35.72
GROUP 2	34.02
GROUP 3	33.80
GROUP 4	33.69
GROUP 5	33.57
GROUP 6	33.57

NOTE ADDITIONAL PREMIUMS:

- On projects requiring an irregular shift a premium of 10% will be paid on wages. The premium will be paid for off-shift or irregular shift work when mandated by Governmental Agency.
- Employees engaged in hazardous/toxic waste removal, on a State or Federally designated hazardous/toxic waste site, where the employee comes in contact with hazardous/toxic waste material and when personal protective equipment is required for respiratory, skin, or eye protection, the employee shall receive an additional 20% premium above the hourly wage.

NOTE - The 'Employer Registration' (30.1) use of a '4 Day/10 Hour Work schedules' will no longer be accepted or processed. All registered projects prior to June 30,2023 will expire within the granted time frame.

For Pre-Registered Projects 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. For further clarification contact your local Bureau Office.

SUPPLEMENTAL BENEFITS

Per hour:

First 40 hours	\$ 44.59
Over 40 hours	36.99

OVERTIME PAY

See (*B, E, **E2, ***P, X) on OVERTIME PAGE

*Holidays worked Monday through Friday receive Double Time (2x) after 8 hours.

**Makeup day limited to the employees who were working on the site that week.

***Sunday Holidays are paid at a rate of double time and one half (2.5x) for all hours worked.

HOLIDAY

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

Overtime: See (*1) on HOLIDAY PAGE

- Any employee working two (2) days in any calendar week during which a holiday occurs shall receive a days pay for each holiday occurring during said week. This provision shall also apply if a holiday falls on a Saturday or Sunday.

*See OVERTIME PAY section for when additional premium is applicable on Holiday hours worked.

11-445B/HH

Teamster - Delivery - Building / Heavy&Highway

02/01/2024

JOB DESCRIPTION Teamster - Delivery - Building / Heavy&Highway

DISTRICT 11

ENTIRE COUNTIES

Dutchess, Orange, Rockland, Sullivan, Ulster

WAGES

Group 1 Tractor Trailer Drivers
Group 2 Tri- Axle

Wages: 07/01/2023

Group 1 \$ 33.70
Group 2 29.70

Hazardous/Toxic Waste Removal additional 20% when personal protective equipment is required.

SUPPLEMENTAL BENEFITS

Per hour paid:

First 40 hours \$ 32.30
Over 40 hours 0.00

OVERTIME PAY

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

HOLIDAY

Paid: See (5, 13, 15, 16, 20, 22, 25, 26) on HOLIDAY PAGE

Overtime: See (5, 13, 15, 16, 20, 22, 25, 26) on HOLIDAY PAGE

- Employee must work either the scheduled day of work before or the scheduled day of work after the holiday in the workweek.
- Any employee working one (1) day in the calendar week during which a holiday occurs shall receive a day's pay for each holiday occurring during said week. This provision shall also apply if a holiday falls on a Saturday.
- When any of the recognized holidays occur on Sunday and are celebrated any day before or after the holiday Sunday, such days shall be considered as the holiday and paid for as such.

11-445 B/HH Delivery

Welder

02/01/2024

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 07/01/2023

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 12226

REQUEST FOR WAGE AND SUPPLEMENT INFORMATION

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

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

This Form Must Be Typed

Submitted By:

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

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

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

Telephone

Fax

E-Mail:

2. NY State Units (see Item 5).

☐ 01 DOT

☐ 02 OGS

☐ 03 Dormitory Authority

☐ 04 State University
Construction Fund

☐ 05 Mental Hygiene
Facilities Corp.

☐ 06 OTHER N.Y. STATE UNIT

☐ 07 City

☐ 08 Local School District

☐ 09 Special Local District, i.e.,
Fire, Sewer, Water District

☐ 10 Village

☐ 11 Town

☐ 12 County

☐ 13 Other Non-N.Y. State
(Describe)

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

Telephone

Fax

E-Mail:

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

☐ New Schedule of Wages and Supplements.

APPROXIMATE BID DATE :

☐ Additional Occupation and/or Redetermination

PRC NUMBER ISSUED PREVIOUSLY FOR
THIS PROJECT :

OFFICE USE ONLY

B. PROJECT PARTICULARS

5. Project Title

Description of Work

Contract Identification Number

Note: For NYS units, the OSC Contract No.

6. Location of Project:

Location on Site

Route No/Street Address

Village or City

Town

County

7. Nature of Project - Check One:

- ☐ 1. New Building
☐ 2. Addition to Existing Structure
☐ 3. Heavy and Highway Construction (New and Repair)
☐ 4. New Sewer or Waterline
☐ 5. Other New Construction (Explain)
☐ 6. Other Reconstruction, Maintenance, Repair or Alteration
☐ 7. Demolition
☐ 8. Building Service Contract

8. OCCUPATION FOR PROJECT :

- ☐ Construction (Building, Heavy
Highway/Sewer/Water)
☐ Tunnel
☐ Residential
☐ Landscape Maintenance
☐ Elevator maintenance
☐ Exterminators, Fumigators
☐ Fire Safety Director, NYC Only

- ☐ Fuel Delivery
☐ Guards, Watchmen
☐ Janitors, Porters, Cleaners,
Elevator Operators
☐ Moving furniture and
equipment
☐ Trash and refuse removal
☐ Window cleaners
☐ Other (Describe)

9. Does this project comply with the Wicks Law involving separate bidding? YES ☐ NO ☐

10. Name and Title of Requester

Signature



NEW YORK STATE DEPARTMENT OF LABOR
Bureau of Public Work - Debarment List

**LIST OF EMPLOYERS INELIGIBLE TO BID ON OR BE
AWARDED ANY PUBLIC WORK CONTRACT**

Under Article 8 and Article 9 of the NYS Labor Law, a contractor, sub-contractor and/or its successor shall be debarred and ineligible to submit a bid on or be awarded any public work or public building service contract/sub-contract with the state, any municipal corporation or public body for a period of five (5) years from the date of debarment when:

- Two (2) final determinations have been rendered within any consecutive six-year (6) period determining that such contractor, sub-contractor and/or its successor has WILLFULLY failed to pay the prevailing wage and/or supplements;
- One (1) final determination involves falsification of payroll records or the kickback of wages and/or supplements.

The agency issuing the determination and providing the information, is denoted under the heading 'Fiscal Officer'. DOL = New York State Department of Labor; NYC = New York City Comptroller's Office; AG = New York State Attorney General's Office; DA = County District Attorney's Office.

Debarment Database: To search for contractors, sub-contractors and/or their successors debarred from bidding or being awarded any public work contract or subcontract under NYS Labor Law Articles 8 and 9, or under NYS Workers' Compensation Law Section 141-b, access the database at this link: <https://apps.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 02/09/2024

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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	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		ALL COUNTY SEWER & DRAIN, INC.		7 GREENFIELD DR WARWICK NY 10990	03/25/2022	03/25/2027
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 GARCIA		515 WEST AVE UNIT PH 13NORWALK CT 06850	05/12/2021	05/12/2026
DOL	DOL		ANGELO TONDO		449 WEST MOMBSHA ROAD MONROE NY 10950	06/06/2022	06/06/2027
DOL	DOL	*****4231	ANKER'S ELECTRIC SERVICE, INC.		10 SOUTH 5TH ST LOCUST VALLEY NY 11560	09/26/2022	09/26/2027
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	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	DOL	*****8421	B & B DRYWALL, INC		206 WARREN AVE APT 1WHITE PLAINS NY 10603	12/14/2021	12/14/2026
DOL	NYC		BALWINDER SINGH		421 HUDSON ST SUITE C5NEW YORK NY 10014	02/20/2019	02/20/2024
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	*****3627	BJB CONSTRUCTION CORP.		38 LONG RIDGE ROAD BEDFORD NY 10506	12/18/2019	12/18/2024
DOL	DOL	*****5078	BLACK RIVER TREE REMOVAL, LLC		29807 ANDREWS ROAD BLACK RIVER NY 13032	10/17/2023	10/17/2028
DOL	DOL	*****4512	BOB BRUNO EXCAVATING, INC		5 MORNINGSIDE DR AUBURN NY 13021	05/28/2019	05/28/2024
DOL	DOL		BOGDAN MARKOVSKI		370 W. PLEASANTVIEW AVE SUITE 2.329HACKENSACK NJ 07601	02/11/2019	02/11/2024
DOL	DOL		BRADLEY J SCHUKA		4 BROTHERS ROAD WAPPINGERS FALLS NY 12590	10/20/2020	10/20/2025
DOL	DOL	*****9383	C.C. PAVING AND EXCAVATING, INC.		2610 SOUTH SALINA ST SUITE 12SYRACUSE NY 13205	09/17/2020	09/17/2025
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	*****4155	CASA BUILDERS, INC.	FRIEDLANDER CONSTRUCTI ON	64 N PUTT CONNERS ROAD NEW PALTZ NY 12561	05/10/2023	05/10/2028
DOL	AG	*****7247	CENTURY CONCRETE CORP		2375 RAYNOR ST RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	DOL	*****0026	CHANTICLEER CONSTRUCTION LLC		4 BROTHERS ROAD WAPPINGERS FALLS NY 12590	10/20/2020	10/20/2025
DOL	NYC	*****2117	CHARAN ELECTRICAL ENTERPRISES		9-11 40TH AVENUE LONG ISLAND CITY NY 11101	09/26/2023	09/26/2028

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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 PAPASTEFANOU A/K/A CHRIS PAPASTEFANOU		1445 COMMERCE AVE BRONX NY 10461	05/30/2019	05/30/2024
DOL	DOL		CRAIG JOHANSEN		10 SOUTH 5TH ST LOCUST VALLEY NY 11560	09/26/2022	09/26/2027
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	*****7619	DANCO CONSTRUCTION UNLIMITED INC.		485 RAFT AVENUE HOLBROOK NY 11741	10/19/2021	10/19/2026
DOL	DOL		DANIEL ROBERT MCNALLY		7 GREENFIELD DRIVE WARWICK NY 10990	03/25/2022	03/25/2027
DOL	DOL		DARIAN L COKER		2610 SOUTH SALINA ST SUITE 2CSYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL		DAVID FRIEDLANDER		64 NORTH PUTT CORNERS RD NEW PALTZ NY 12561	05/10/2023	05/10/2028
DOL	NYC		DAVID WEINER		14 NEW DROP LANE 2ND FLOORSTATEN ISLAND NY 10306	11/14/2019	11/14/2024
DOL	DOL		DELPHI PAINTING & DECORATING CO INC		1445 COMMERCE AVE BRONX NY 10461	05/30/2019	05/30/2024
DOL	DOL		DINA TAYLOR		64 N PUTT CONNERS RD NEW PALTZ NY 12561	05/10/2023	05/10/2028
DOL	DOL	*****5175	EAGLE MECHANICAL AND GENERAL CONSTRUCTION LLC		11371 RIDGE RD WOLCOTT NY 14590	02/03/2020	02/03/2025
DOL	AG		EDWIN HUTZLER		23 NORTH HOWELLS RD BELLPORT NY 11713	08/04/2021	08/04/2026
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		EUGENIUSZ "GINO" KUCHAR		195 KINGSLAND AVE BROOKLYN NY 11222	12/22/2023	12/22/2028
DOL	DOL		FAIGY LOWINGER		11 MOUNTAIN RD 28 VAN BUREN DRMONROE NY 10950	03/20/2019	03/20/2024
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	*****2998	G.E.M. AMERICAN CONSTRUCTION CORP.		195 KINGSLAND AVE BROOKLYN NY 11222	12/22/2023	12/22/2028
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	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	DA		GIOVANNA TRAVALJA		3735 9TH ST LONG ISLAND CITY NY 11101	01/05/2023	01/05/2028
DOL	DA	*****0213	GORILLA CONTRACTING GROUP, LLC		505 MANHATTAN AVE WEST BABYLON NY 11704	10/05/2023	10/05/2028
DOL	DOL		HANS RATH		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
DOL	DOL		HERBERT CLEMEN		42 FOWLER AVENUE CORTLAND MANOR NY 10567	01/24/2023	01/24/2028
DOL	DOL		HERBERT CLEMEN		42 FOWLER AVENUE CORTLAND MANOR NY 10567	10/25/2022	10/25/2027
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.M.J CONSTRUCTION		151 OSTRANDER AVENUE SYRACUSE NY 13205	11/21/2022	11/21/2027
DOL	DOL		J.R. NELSON CONSTRUCTION		531 THIRD STREET ALBANY NY 12206	11/07/2023	11/07/2028

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DOL	DOL		J.R. NELSON CONSTRUCTION		531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL		J.R. NELSON CONSTRUCTION		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		J.R. NELSON, LLC		531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL		J.R. NELSON, LLC		531 THIRD STREET ALBANY NY 12206	11/07/2023	11/07/2028
DOL	DOL		J.R. NELSON, LLC		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		J.R.N COMPANIES, LLC		531 THIRD STREET ALBANY NY 12206	12/12/2022	12/12/2027
DOL	DOL		J.R.N COMPANIES, LLC		531 THIRD STREET ALBANY NY 12206	11/07/2023	11/07/2028
DOL	DOL		J.R.N COMPANIES, LLC		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL	*****1147	J.R.N. CONSTRUCTION, LLC		531 THIRD ST ALBANY NY 12206	11/07/2023	11/07/2028
DOL	DOL	*****1147	J.R.N. CONSTRUCTION, LLC		531 THIRD ST ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL	*****1147	J.R.N. CONSTRUCTION, LLC		531 THIRD ST ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		JAMES J. BAKER		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL		JASON P. RACE		3469 STATE RT. 69 PERISH NY 13131	09/29/2021	09/29/2026
DOL	DOL		JASON P. RACE		3469 STATE RT. 69 PERISH NY 13131	02/09/2022	02/09/2027
DOL	DOL		JASON P. RACE		3469 STATE RT. 69 PERISH NY 13131	11/15/2022	11/15/2027
DOL	DOL		JASON P. RACE		3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL	*****7993	JBS DIRT, INC.		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL	*****2435	JEFFEL D. JOHNSON	JMJ7 AND SON	5553 CAIRNSTRAIL CLAY NY 13041	11/21/2022	11/21/2027
DOL	DOL		JEFFEL JOHNSON ELITE CARPENTER REMODEL AND CONSTRUCTION		C2 EVERGREEN CIRCLE LIVERPOOL NY 13090	11/21/2022	11/21/2027
DOL	DOL	*****2435	JEFFREY M. JOHNSON	JMJ7 AND SON	5553 CAIRNS TRAIL CLAY NY 13041	11/21/2022	11/21/2027
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	DOL		JMJ7 & SON CONSTRUCTION, LLC		5553 CAIRNS TRAIL LIVERPOOL NY 13041	11/21/2022	11/21/2027
DOL	DOL		JMJ7 AND SONS CONTRACTORS		5553 CAIRNS TRAIL CLAY NY 13041	11/21/2022	11/21/2027
DOL	DOL		JMJ7 CONTRACTORS		7014 13TH AVENUE BROOKLYN NY 11228	11/21/2022	11/21/2027
DOL	DOL		JMJ7 CONTRACTORS AND SONS		5553 CAIRNS TRAIL CLAY NY 13041	11/21/2022	11/21/2027
DOL	DOL		JMJ7 CONTRACTORS, LLC		5553 CAIRNS TRAIL CLAY NY 13041	11/21/2022	11/21/2027
DOL	DOL		JOHN GOCEK		14B COMMERCIAL AVE ALBANY NY 12065	11/14/2019	11/14/2024
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	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		JOSEPH K. SALERNO		1010 TILDEN AVE UTICA NY 13501	07/24/2023	07/24/2028
DOL	DOL		JOSEPH K. SALERNO II		1010 TILDEN AVE UTICA NY 13501	07/24/2023	07/24/2028
DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING		3469 STATE RT. 69 PERISH NY 13131	02/09/2022	02/09/2027
DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING		3469 STATE RT. 69 PERISH NY 13131	11/15/2022	11/15/2027

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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	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING		3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL	*****5116	JP RACE PAINTING, INC. T/A RACE PAINTING		3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL		JRN CONSTRUCTION CO, LLC		1024 BROADWAY ALBANY NY 12204	11/07/2023	11/07/2028
DOL	DOL	*****1147	JRN CONSTRUCTION, LLC		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL	*****1147	JRN CONSTRUCTION, LLC		531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL	*****1147	JRN CONSTRUCTION, LLC		531 THIRD STREET ALBANY NY 12206	11/07/2023	11/07/2028
DOL	DOL		JRN PAVING, LLC		531 THIRD STREET ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		JRN PAVING, LLC		531 THIRD STREET ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL		JRN PAVING, LLC		531 THIRD STREET ALBANY NY 12206	11/07/2023	11/07/2028
DOL	DOL		JULIUS AND GITA BEHREND		5 EMES LANE MONSEY NY 10952	11/20/2002	11/20/3002
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		KEAN INDUSTRIES, LLC		2345 RT. 52 SUITE 2NHOPEWELL JUNCTION NY 12533	12/18/2023	12/18/2028
DOL	DOL	*****2959	KELC DEVELOPMENT, INC		7088 INTERSTATE ISLAND RD SYRACUSE NY 13209	03/31/2021	03/31/2026
DOL	DOL		KIMBERLY F. BAKER		7901 GEE ROAD CANASTOTA NY 13032	08/17/2021	08/17/2026
DOL	DOL		KMA GROUP II, INC.		29-10 38TH AVENUE LONG ISLAND CITY NY 11101	10/11/2023	10/11/2028
DOL	DOL	*****1833	KMA GROUP INC.		29-10 38TH AVENUE LONG ISLAND CITY NY 11101	10/11/2023	10/11/2028
DOL	DOL		KMA INSULATION, INC.		29-10 38TH AVENUE LONG ISLAND CITY NY 11101	10/11/2023	10/11/2028
DOL	DOL		KRIN HEINEMANN		2345 ROUTE 52, SUITE 2N HOPEWELL JUNCTION NY 12533	12/18/2023	12/18/2028
DOL	NYC		KULWANT S. DEOL		9-11 40TH AVENUE LONG ISLAND CITY NY 11101	09/26/2023	09/26/2028
DOL	DA	*****8816	LAKE CONSTRUCTION AND DEVELOPMENT CORPORATION		150 KINGS STREET BROOKLYN NY 11231	08/19/1998	08/19/2998
DOL	DOL		LEROY E. NELSON JR		531 THIRD ST ALBANY NY 12206	10/25/2022	10/25/2027
DOL	DOL		LEROY E. NELSON JR		531 THIRD ST ALBANY NY 12206	12/22/2022	12/22/2027
DOL	DOL		LEROY E. NELSON JR		531 THIRD ST ALBANY NY 12206	11/07/2023	11/07/2028
DOL	AG	*****3291	LINTECH ELECTRIC, INC.		3006 TILDEN AVE BROOKLYN NY 11226	02/16/2022	02/16/2027
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	*****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		MARIA NUBILE		84-22 GRAND AVENUE ELMHURST NY 11373	03/10/2020	03/10/2025
DOL	DOL		MATTHEW P. KILGORE		4156 WILSON ROAD EAST TABERG NY 13471	03/26/2019	03/26/2024
DOL	DOL	*****4829	MILESTONE ENVIRONMENTAL CORPORATION		704 GINESI DRIVE SUITE 29MORGANVILLE NJ 07751	04/10/2019	04/10/2024

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DOL	NYC	*****9926	MILLENNIUM FIRE PROTECTION, LLC		325 W. 38TH STREET SUITE 204NEW YORK NY 10018	11/14/2019	11/14/2024
DOL	NYC	*****0627	MILLENNIUM FIRE SERVICES, LLC		14 NEW DROP LNE 2ND FLOORSTATEN ISLAND NY 10306	11/14/2019	11/14/2024
DOL	DOL	*****1320	MJC MASON CONTRACTING, INC.		42 FOWLER AVENUE CORTLAND MANOR NY 10567	10/25/2022	10/25/2027
DOL	DOL	*****1320	MJC MASON CONTRACTING, INC.		42 FOWLER AVENUE CORTLAND MANOR NY 10567	01/24/2023	01/24/2028
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	DOL	*****7790	NATIONAL BUILDING & RESTORATION CORP		1010 TILDEN AVE UTICA NY 13501	07/24/2023	07/24/2028
DOL	DOL	*****1797	NATIONAL CONSTRUCTION SERVICES, INC		1010 TILDEN AVE UTICA NY 13501	07/24/2023	07/24/2028
DOL	NYC		NAVIT SINGH		402 JERICHO TURNPIKE NEW HYDE PARK NY 11040	08/10/2022	08/10/2027
DOL	DOL		NELCO CONTRACTING, LLC		1024 BROADWAY ALBANY NY 12204	11/07/2023	11/07/2028
DOL	DA		NICHOLAS T. ANALITIS		505 MANHATTAN AVE WEST BABYLON NY 11704	10/05/2023	10/05/2028
DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	03/01/2022	03/01/2027
DOL	DOL		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	11/15/2022	11/15/2027
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		NICHOLE E. FRASER A/K/A NICHOLE RACE		3469 STATE RT. 69 PERISH NY 13131	02/09/2022	02/09/2027
DOL	DOL	*****7429	NICOLAE I. BARBIR	BESTUCCO CONSTRUCTI ON, INC.	444 SCHANTZ ROAD ALLEN TOWN PA 18104	09/17/2020	09/17/2025
DOL	NYC	*****5643	NYC LINE CONTRACTORS, INC.		402 JERICHO TURNPIKE NEW HYDE PARK NY 11040	08/10/2022	08/10/2027
DOL	DOL		PATRICK PENNACCHIO		2345 RT. 52 SUITE 2NHOPEWELL JUNCTION NY 12533	12/18/2023	12/18/2028
DOL	DOL		PATRICK PENNACCHIO		2345 RT. 52 SUITE 2NHOPEWELL JUNCTION NY 12533	12/18/2023	12/18/2028
DOL	DOL		PAULINE CHAHALES		935 S LAKE BLVD MAHOPAC NY 10541	03/02/2021	03/02/2026
DOL	DOL		PETER STEVENS		11 OLD TOWN ROAD SELKIRK NY 12158	02/02/2021	02/02/2026
DOL	DOL		PETER STEVENS		8269 21ST ST BELLEROSE NY 11426	12/22/2022	12/22/2027
DOL	DOL	*****0466	PRECISION BUILT FENCES, INC.		1617 MAIN ST PEEKSKILL NY 10566	03/03/2020	03/03/2025
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	07/11/2022	07/11/2027
DOL	DA	*****7559	REGAL CONTRACTING INC.		24 WOODBINE AVE NORTHPORT NY 11768	10/01/2020	10/01/2025
DOL	DOL		RICHARD REGGIO		1617 MAIN ST PEEKSKILL NY 10566	03/03/2020	03/03/2025
DOL	DOL		ROBBYE BISSESEAR		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	DOL		ROMEO WARREN		161 ROBYN RD MONROE NY 10950	07/11/2022	07/11/2027
DOL	DOL		RONALD MESSEN		14B COMMERCIAL AVE ALBANY NY 12065	11/14/2019	11/14/2024
DOL	DOL	*****7172	RZ & AL INC.		198 RIDGE AVENUE VALLEY STREAM NY 11581	06/06/2022	06/06/2027
DOL	DOL	*****1365	S & L PAINTING, INC.		11 MOUNTAIN ROAD P.O BOX 408MONROE NY 10950	03/20/2019	03/20/2024

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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	DA	*****0476	SAMCO ELECTRIC CORP.		3735 9TH ST LONG ISLAND CITY NY 11101	01/05/2023	01/05/2028
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	NYC	*****6597	SHAIRA CONSTRUCTION CORP.		421 HUDSON STREET SUITE C5NEW YORK NY 10014	02/20/2019	02/20/2024
DOL	DOL		SHULEM LOWINGER		11 MOUNTAIN ROAD 28 VAN BUREN DRMONROE NY 10950	03/20/2019	03/20/2024
DOL	DA		SILVANO TRAVAJA		3735 9TH ST LONG ISLAND CITY NY 11101	01/05/2023	01/05/2028
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	NYC	*****3661	SPANIER BUILDING MAINTENANCE CORP		200 OAK DRIVE SYOSSET NY 11791	03/14/2022	03/14/2027
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	*****3800	SUBURBAN RESTORATION CO. INC.		5-10 BANTA PLACE FAIR LAWN PLACE NJ 07410	03/29/2021	03/29/2026
DOL	DOL	*****1060	SUNN ENTERPRISES GROUP, LLC		370 W. PLEASANTVIEW AVE SUITE 2.329HACKENSACK NJ 07601	02/11/2019	02/11/2024
DOL	DOL	*****9150	SURGE INC.		8269 21ST STREET BELLEROSE NY 11426	12/22/2022	12/22/2027
DOL	DOL		SYED RAZA		198 RIDGE AVENUE NY 11581	06/06/2022	06/06/2027
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	*****5766	THE COKER CORPORATION	COKER CORPORATION	2610 SOUTH SALINA ST SUITE 14SYRACUSE NY 13205	09/17/2020	09/17/2025
DOL	DOL		TIMOTHY PERCY		29807 ANDREWS ROAD BLACK RIVER NY 13612	10/17/2023	10/17/2028

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DOL	DA	*****1050	TRI STATE CONSTRUCTION OF NY CORP.		50-39 175TH PLACE FRESH MEADOWS NY 11365	03/28/2022	03/28/2027
DOL	DA	*****4106	TRIPLE H CONCRETE CORP		2375 RAYNOR STREET RONKONKOMA NY 11779	08/04/2021	08/04/2026
DOL	DOL	*****8210	UPSTATE CONCRETE & MASONRY CONTRACTING CO INC		449 WEST MOMBSHA ROAD MONROE NY 10950	06/06/2022	06/06/2027
DOL	DOL	*****6418	VALHALLA CONSTRUCTION, LLC.		796 PHLEPS ROAD FRANKLIN LAKES NJ 07417	12/01/2020	12/01/2025
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		VIKTORIA RATH		24 ELDOR AVENUE NEW CITY NY 10956	02/03/2020	02/03/2025
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	*****8266	WILLIAM CHRIS MCCLENDON	MCCLENDON ASPHALT PAVING	1646 FALLS STREET NIAGARA FALLS NY 14303	05/01/2023	05/01/2028
DOL	DOL		WILLIAM CHRIS MCCLENDON		1646 FALLS STREET NIAGARA FALLS NY 14303	05/01/2023	05/01/2028
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		XENOFON EFTHIMIADIS		29-10 38TH AVENUE LONG ISLAND CITY NY 11101	10/11/2023	10/11/2028

TECHNICAL SPECIFICATIONS

**WEST MAIN STREET
PUMP STATION and FORCE MAIN**

Technical Specifications

Prepared for:

**CITY OF BEACON
DUTCHESS COUNTY, NEW YORK**



Prepared by:

**T&B Engineering & Landscape Architecture, P.C.
47 West Market Street, Suite 2
Rhinebeck, NY 12572**

and

**Lanc & Tully Engineering and Surveying, P.C.
P.O. Box 687
Goshen, NY 10924**

October 2022

DUTCHESS COUNTY DEPARTMENT OF HEALTH

APPROVED

DATE: 5/8/2023

PROJECT: WEST MAIN PUMP STATION

C BEACON

24 SHEETS, ENO-REP, SAEC

[Signature], PE
SUPERVISING PUBLIC HEALTH ENGINEER

RECEIVED
MAR 31 2023
BY: _____

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PART 1 GENERAL

1.1. SECTION INCLUDES

1.1.1 Summary of work under this Contract.

1.2. SYSTEM DESCRIPTION

1.2.1. The West Main Pump Station & Force Main project is located in the City of Beacon, Dutchess County, New York and it entails the installation of a new complete sewage pump station, electrical generator, approximately 2,475 linear feet of 12" C900 DR-25 pressure-rated PVC pipe for the force main, one air release manhole with valves, excavation and backfilling of new gas line trench along West Main Street, installation of 1" copper water service for pump station site, installation of chain link fencing and gate, and all else required to provide for a complete project. The new pump station shall be tested and have a full start-up with the City of Beacon present. The force main shall be pressure tested. The generator shall have a full start-up with the City of Beacon present. A complete O&M manual shall be prepared for the entire project and shall be provided to the City of Beacon in hard copy as well as electronic format. All disturbed areas, such as curbing, pavement, grass areas, etc., shall be restored to a condition equal to or better than existed prior to the project. The Contractor will be responsible to provide all labor, tools, electric power, construction equipment, materials, and all other facilities, services and permits necessary for the proper execution and construction of work. Included in this work shall be acquiring all work permits from local, state or federal agencies, required permits from Metro-North Railroad, excavation, backfill material, backfilling, compaction, paving, concrete, supply and installation of all piping, structures, fittings, valves, castings, testing, and restoration of all disturbed areas, including road surfaces as called for in these specifications and bid documents.

** END OF SECTION **

PART 1 GENERAL

1.1. WORK INCLUDED

- 1.1.1. Requirements describing the work to be done by others.

1.2. SYSTEM DESCRIPTION

- 1.2.1. Prior to the commencement of construction, the contractor shall meet with all known public and private utility companies occupying the work site, as well as Metro-North Railroad. The contractor, at this meeting(s), shall inform the utility companies and Metro-North Railroad of their schedule of operations and coordinate his work with these companies. The contractor shall keep minutes of the meeting(s) and shall submit them to the engineer.

The contractor specifically agrees that he has included in his unit prices and lump sum prices, any additional cost of doing the work under this contract because of the fact that he may not have a clear site for the work, and because of interference of roadway use by the utilities, and the necessity or desirability of opening certain sections of pavement to traffic before the entire work is completed.

- 1.2.2. Work on certain existing utilities may be required to be done by the utility forces. The contractor shall coordinate this work with the utility authority having jurisdiction and schedule all such work, and shall account for this within their contract costs.

**** END OF SECTION ****

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for work required not included in other sections within this Specification.

1.2. SYSTEM DESCRIPTION

- 1.2.1. WORK PERMITS - HIGHWAY & METRO-NORTH RAILROAD
 - 1.2.1.1. Contractor shall be responsible to obtain and maintain all local, county and state highway work permits required for completion of project, as well as all permits as required by Metro-North Railroad. This shall include all costs for acquiring permits.
 - 1.2.2. Contractor is responsible for maintenance of traffic and access to businesses, and maintenance of pedestrian traffic. Contractor shall ensure that at least one lane is open for traffic at all times and shall sufficiently staff traffic control with flag personnel to ensure smooth continued operations of traffic.
 - 1.2.2.1. Contractor shall construct temporary walkways, ramps and all else necessary to maintain access to businesses and homes at all times.
 - 1.2.2.2. In areas where sidewalks have been removed by the Contractor, the Contractor shall provide a smooth passable walkway to allow for the continued flow of pedestrian traffic, so that pedestrians are not forced to walk within the roadway.
 - 1.2.2.3. Access for emergency vehicles shall be maintained at all times. Contractor shall on site certified road plates at excavations within the roadway to ensure that the trench(s) could be covered to allow for passage of emergency vehicles.
 - 1.2.2.4. Two-way traffic shall be maintained during working hours, UNLESS OTHERWISE APPROVED BY THE CITY OF BEACON IN ADVANCE.
 - 1.2.2.5. If one-way traffic approved by the City of Beacon, at the end of each workday, two-way traffic shall be re-established and maintained during non-working hours.

- 1.2.2.6. Contractor shall provide all necessary signs, barricades, warning lights, flag personnel, etc. required by the NYSDOT Manual of Traffic Control Devices, and as directed by the Engineer. All traffic control devices shall be in accordance with the NYSDOT Manual of Traffic Control Devices. Warning lights shall be supplied and mounted on barricades during the duration of the project. Warning lights shall be operational each night for the duration of the project.
- 1.2.3. MISCELLANEOUS ITEMS
- 1.2.3.1. Crews shall be sufficiently manned and equipped to complete the required tasks.
- 1.2.3.2. Existing sanitary sewer manhole structures and sanitary sewer piping shall be removed and disposed of properly where noted on plans or abandoned in place where noted on plans. When sewer main is to be abandoned in place, sewer manholes shall have upper half of structure completely removed and structure shall be filled with excavated materials from site and compacted in 9" lifts maximum on interior of structure. Sewer lines to be abandoned in place shall be filled completely with Low Density Cellular Concrete (LDCC) in accordance with Section 02212 of the technical specifications.
- 1.2.3.3. Contractor shall dig test pits in accordance with Section "Test Pits - Verification of Utilities & Structures", Division 2 to verify existing location and elevation of utilities and to check for any conflicts between proposed storm drainage, sewer main, sewer services, water main, water services, and existing utilities.
- 1.2.3.4. Where Contractor damages unlocated house water service, Contractor shall repair water service with new K-copper pipe and required fittings.
- 1.2.3.5. Where Contractor damages unlocated sewer service, Contractor shall repair sewer service with new PVC pipe and required fittings and shall connect service to new sewer main.
- 1.2.3.6. Contractor shall restore all disturbed lawn and landscaped areas to pre-existing, or better than, pre-existing conditions. Restoration of all lawn areas shall commence within 48 hours after construction has been completed in that area of disturbance.
- 1.2.3.7. Contractor shall excavate and bed trench line along West Main Street to allow for installation of new gas line from intersection of West Main and River Street to, and into, the new pump station site. After Central Hudson has installed the new gas line, Contractor shall backfill trench per Central Hudson's standards and restore the roadway pavement per the contract.

- 1.2.3.8. Contractor shall install air release manhole at high-point along force main where shown on plans. This shall include the installation of all fittings, 4" DeZurik PEC Eccentric plug valve, 4" DeZurik APCO Combination Air Valve, and 4" PVC SDR-26 drain line.
- 1.2.3.9. Contractor shall pave the trench(s) in West Main Street, River Street, and Beekman Street with temporary pavement at the end of each day. Temporary pavement shall be 3" of binder course. Temporary pavement shall be maintained until such time as Contractor is ready to install final pavement section per plans.
- 1.2.3.10. All material excavated at new sewage pump station shall be carefully loaded and hauled to Green Ridge disposal facility in Ganesvoort, Saratoga County, NY, in accordance with the Phase II Environmental Site Assessment report as prepare by LaBella.

PART 2 PRODUCTS

2.1. ACCEPTABLE MANUFACTURERS

- 2.1.1. Manhole frames and covers shall be Pattern No. 1009 or 1460B as called out on the plans and as manufactured by Campbell Foundry Company, Harrison, New Jersey, or approved equal, and shall be **Domestically Made**. Covers shall be either marked "SEWER" or "STORM", depending upon application.
- 2.1.2. 4" PEC Eccentric ductile iron plug valve shall be as manufactured by DeZurik.
- 2.1.3. 4" APCO combination air release valve shall be as manufactured by DeZurik.

PART 3 EXECUTION

3.1. UTILITY CASTINGS

- 3.1.1. Utility castings (catch basins, manholes, valve boxes, etc.) shall be set a $\frac{1}{4}$ "below the grade of the finished pavement or finished ground surface. Valve box risers shall not be used.
- 3.1.2. Solid concrete brick shall be used to adjust the grade of manhole and catch basin frames no more than 11 inches. Solid concrete block or grade rings are acceptable.
- 3.1.3. Frames shall be set concentric with the top of the masonry and in a full bed of mortar so that the space between the top of the masonry and the bottom flange of the frame shall be completely filled and watertight.

- 3.1.4. A thick plug of mortar extending to the outer edge of the manhole shall be placed all around and on the top of the bottom flange. The mortar shall be smoothly finished and have a slight slope to shed water away from the frame.

PART 4 MEASUREMENT AND PAYMENT

4.1. MEASUREMENT

- 4.1.1. Measurement of maintaining access to business and homes shall not be made. This would include the construction or installation of any ramps, steel plates, etc. to allow for access.
- 4.1.2. Measurement for miscellaneous items shall be as follows:
- 4.1.2.1. Measurement for crews being sufficiently manned and equipped shall not be made.
- 4.1.2.2. Measurement of sewer manhole removal; sanitary sewer piping removal; proper disposal of all excavated materials piping and structures; and abandoning of manholes in place shall be Lump Sum. Abandonment of sewer lines in place with Low Density Cellular Concrete shall be paid in accordance with Section 02212.
- 4.1.2.3. Measurement of test pits shall be Lump Sum.
- 4.1.2.4. Measurement for repair of existing unlocated water service shall be by the unit.
- 4.1.2.5. Measurement for repair of damaged unlocated sewer service shall not be made.
- 4.1.2.6. Measurement for the restoration of lawn and landscaped areas shall be Lump Sum.
- 4.1.2.7. Measurement for the excavation, bedding, and backfilling of the gas line trench shall be by the linear foot.
- 4.1.2.8. Measurement for installation of air release manhole shall be lump sum.
- 4.1.2.9. Measurement for temporary pavement along West Main Street, River Street and Beekman Street shall be by the square yard.
- 4.1.2.10. Measurement for hauling and disposal of excavated material from pump station site shall be by the cubic yard.
- 4.1.3. Measurement of traffic control shall be Lump Sum.

4.2. PAYMENT

- 4.2.1. There is no payment for maintaining access to businesses within the contract limits or providing for a passable pedestrian/vehicular access.
- 4.2.2. Unit price for miscellaneous items should be as follows.
 - 4.2.2.1. There is no payment for crews being sufficiently manned and equipped.
 - 4.2.2.2. Lump Sum price for removal of existing sewer main and associated sewer manholes shall include excavation; disposal of all wastes, piping and structures; backfilling of excavation with Select Material No. 4 within road right-of-way; compaction of backfill materials in 8" lifts; grouting of sewer lines to be abandoned in place; equipment; labor; tools; and all else incidental and necessary to complete the work.
 - 4.2.2.3. Lump sum price for test pits shall include excavation, acquiring of all pertinent information as noted in Section 02015, "Test Pits - Verification of utilities and structures," backfilling with select material #4, compaction, equipment, labor, and all else incidental and necessary to complete the work.
 - 4.2.2.4. Unit price for repair of unlocated damaged water service shall include excavation, removal of existing damaged water service piping, supplying and installation of k-copper pipe, backfilling with Select Material No. 4, compaction, all fittings required, disposal of all surplus material, equipment, labor, and all else incidental and necessary to complete the work.
 - 4.2.2.5. There is no measurement for repair of damaged unlocated house sewer services, as the project requires the installation of new sewer services at the location of all existing active sewer laterals. Contractor shall make a temporary repair of the service until such time as the new sanitary sewer service line is installed.
 - 4.2.2.6. Lump sum price for restoration of lawn and landscaped areas shall include screened topsoil in accordance with Section 02830, placing of topsoil, seed, mulch, watering, replacement of wood mulch and plantings if removed, disposal of all wastes, equipment, labor, and all else incidental and necessary to complete the work.
 - 4.2.2.7. Unit price for gas line trenching shall include saw cutting of pavement, excavation of trench, installation of sand bedding, coordination with Central Hudson for installation of gas line, backfilling of pipe with sand to 6" above gas line, and backfilling remainder of trench with Select Material No. 4 (NYSDOT Item No. 304.12), disposal of all wastes, equipment, labor, and all else incidental and necessary to complete the work. Pavement for restoration of trench shall be in accordance with Section 02513.

- 4.2.2.8. Lump sum price for air release manhole shall include saw cutting of pavement, supply and installation of concrete manhole structure, supply and installation of all fittings and valves, supply and installation of 4" drain line, backfilling of all excavations with Select Material No. 4 (NYSDOT Item No. 304.12), compaction, disposal of all wastes, equipment, labor, and all else incidental and necessary to complete the work. Pavement for restoration of trench shall be in accordance with Section 02513.
- 4.2.2.9. Unit price for temporary pavement shall include supplying of asphaltic binder course asphalt at end of each day, preparation of trench surface for 3" of asphaltic binder course, installation of asphaltic binder course, compaction of asphaltic binder, disposal of all surplus material, equipment, labor, and all else incidental and necessary to complete the work.
- 4.2.2.10. Unit price for hauling and disposal of material from sewage pump station site shall include loading of material, hauling of material to designated disposal site, costs for disposal of material at disposal site, any testing that may be required, disposal of all surplus material, equipment, labor, and all else incidental and necessary to complete the work.
- 4.2.3. Lump Sum price for traffic control shall include installation and removal of traffic control signage, flaggers, installation and removal of barricades, lights, cones, traffic barrels, etc. as required in accordance with the NYSDOT Manual of Uniform Traffic Control and other items as directed by the Highway Superintendent and/or project engineer.
- 4.2.4. Where there is no unit price for any required task, the cost for such task shall be included in other bid unit price.

**** END OF SECTION ****

PART 1 GENERAL

1.1. SECTION INCLUDES

1.1.1. Requirements for prohibiting the following construction procedures.

1.2. SYSTEM DESCRIPTION

1.2.1. Prohibited construction procedures for all parts of the work include, but are not limited to, the following:

- 1.2.1.1. Dumping of spoil material into any stream corridor, any wetlands, any surface waters, or at unspecified locations.
- 1.2.1.2. Indiscriminate, arbitrary or capricious operation of equipment in any stream corridors, any wetlands, or any surface waters.
- 1.2.1.3. Pumping of silt-laden water from trenches or other excavations into any surface waters, any stream corridors, or any wetlands.
- 1.2.1.4. Damaging vegetation adjacent to or outside of the access road or right- of-way.
- 1.2.1.5. Disposal of trees, brush, and other debris in any stream corridors, any wetlands, any surface waters, or at unspecified locations.
- 1.2.1.6. Permanent or unspecified alteration of the flow line of the stream.
- 1.2.1.7. Open burning of debris.
- 1.2.1.8. Applying any pesticides, including defoliants, desiccants, and plant regulators, in any wetlands.
- 1.2.1.9. Applying pesticides whose residues and metabolic products persist in the environment over extended periods of time.
- 1.2.1.10. Locating storage, stockpile, staging and de-watering controls in environmentally sensitive areas.
- 1.2.1.11. Disposal of excess excavation material in wetlands, stream corridors and flood plains.

- 1.2.2. Permission or other arrangements with a land owner or others shall not relieve the Contractor of compliance with the requirements of this section.
- 1.2.3. Any violation of the requirements of this section by the Contractor or any person employed by him will be brought to the immediate attention of the responsible regulatory agencies with a request that appropriate action be taken against the offending parties. Further, the Contractor will be required to remedy any violation at his own expense.

**** END OF SECTION ****

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements pertaining to cutting and patching as required to perform the work.

1.2. SYSTEM DESCRIPTION

- 1.2.1. The work includes cutting and patching as required for the removal or installation of equipment, correcting damaged concrete or masonry surfaces and for modifications to existing structures as shown on the drawings and as specified herein.
- 1.2.2. Patching, replacing and refinishing of concrete and masonry work shall match the adjoining work.
- 1.2.3. Unused openings left by removal of piping, conduit, duct and equipment, or portions disturbed during the work, shall be patched.
- 1.2.4. New concrete work shall be made integral with the existing concrete as shown on the drawings and in accordance with the Section "Cast in Place Concrete," Division 3.
- 1.2.5. Existing concrete that has been or is in contact with sewage, shall be sandblasted to a grease free condition before applying the bonding compounds. Bonding compounds shall be applied as described in the Section "Cast in Place Concrete," Division 3.
- 1.2.6. Exposed existing reinforcing bars shall be cleaned by wire brushing before connecting to new bars. New reinforcing bars shall be capped or welded or as shown on the drawings.
- 1.2.7. Where portions of existing structures and equipment are to be removed and where the remaining concrete shall be finished smooth, the Contractor shall cut off any projecting reinforcing to provide at least one inch of cover over the existing reinforcement. The concrete shall be roughened and a bonding compound applied to the existing concrete as described in the Section "Cast In Place Concrete," Division 3. Cement mortar shall be placed in excess of the finished surface and steel troweled flush with the adjacent surface.
- 1.2.8. When concrete is cut to provide openings for new pipe gate stems, or other penetrations, pipe sleeves shall be accurately installed and grouted in place.

- 1.2.9. Before patching, embedded conduits, pipes and other embedded items left in place shall be cut to at least two inches into the wall, floor or ceiling.

1.3. SUBMITTALS

- 1.3.1. The Contractor shall submit a written request to the Engineer before cutting or executing alteration work which affects the following:

- 1.3.1.1. Owner's operation;
- 1.3.1.2. Structural value or integrity of any element of the project;
- 1.3.1.3. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems;
- 1.3.1.4. Efficiency, operational life, maintenance or safety of operational elements; or,
- 1.3.1.5. Visual qualities of sight-exposed elements.

- 1.3.2. The submittal request shall include but not be limited to the following:

- 1.3.2.1. Description of affected work;
- 1.3.2.2. The necessity for cutting, alteration or excavation;
- 1.3.2.3. Effect on owner's operation or on structural or weatherproof integrity of project; and,
- 1.3.2.4. Description of proposed work:

Scope of cutting, patching, alteration, or excavation.
Products proposed to be used.
Extent of refinishing to be done.

- 1.3.3. Submittals shall be in accordance with the Sections "Shop Drawings and Samples," Division 1 and "Review of Contractor's Construction Procedures," Division 1.

PART 2 PRODUCTS

2.1. ACCEPTABLE MANUFACTURERS

- 2.1.1. **Concrete Bonding Compounds:** As specified in the Contract Documents or as approved by the Engineer.

2.2. MATERIALS

- 2.2.1. Materials for patching and restoration of surfaces shall match the adjoining work and shall be as specified in the respective sections of these specifications.

PART 3 EXECUTION

3.1. INSPECTION

- 3.1.1. Inspect existing conditions of project, including elements subject to damage or to movement during cutting and patching.
- 3.1.2. After uncovering work, inspect conditions affecting installation of products, or performance of work.
- 3.1.3. Report unsatisfactory or questionable conditions to Engineer in writing.

3.2. PREPARATION

- 3.2.1. Provide adequate temporary support as necessary to assure structural value or integrity of affected portion of work.
- 3.2.2. Provide devices and methods to protect other portions of project from damage.
- 3.2.3. Provide protection from elements for that portion of the project which may be exposed by cutting and patching work, and maintain excavations free from water.

3.3. INSTALLATION

- 3.3.1. Execute cutting and demolition by methods which will prevent damage to other work, and will provide proper surfaces to receive installation of repairs or new work.
- 3.3.2. Execute excavating and backfilling by methods which will prevent settlement or damage to the work.
- 3.3.3. Execute fitting and adjustment of products to provide finished installation to comply with specified products, functions, tolerances and finishes.
- 3.3.4. Restore work which has been cut or removed; install new products to provide complete work in accordance with requirements of contract documents.
- 3.3.5. Fit work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.

**** END OF SECTION ****

SECTION 01047
UTILITIES - NOTIFICATION AND MARK OUT

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for notifying utility owners and marking out existing utilities on the site.

1.2. SYSTEM DESCRIPTION

- 1.2.1. Contractor shall be responsible for protection of underground facilities in accordance with 16 NYCRR Part 753.
- 1.2.2. Prior to construction, contractor shall call the UFPO, and **notify in writing** owners of utilities and structures within the vicinity of the proposed work. Copies of written notification to utility owners shall be submitted to the engineer.
- 1.2.3. **Contractor shall provide the engineer with a list of all owners of utilities and structures contacted, including the time and date of contact and the names of responsible individuals contacted.**
- 1.2.4. Contractor shall be responsible for full mark out of existing utilities and structures sufficiently in advance of the work to allow for a field evaluation of the routing of the work. Contractor shall not proceed with work where utilities have not been located and marked by utility companies or others.
- 1.2.5. The contractor shall maintain the mark out of existing utilities and structures until the work in the vicinity of the marked out utilities and structures has progressed sufficiently in advance thereof that their location is no longer required.

1.3. SITE CONDITIONS

- 1.3.1. The locations of all utilities and structures as shown on the drawings are based on the best information available, but neither the owner nor the engineer guarantee the accuracy or completeness of the data.
- 1.3.2. Other utilities and structures may exist within the construction site in addition to those shown on the drawings.
- 1.3.3. House service utility lines may or may not be shown on the drawings. The contractor shall be responsible for checking these services as to actual locations and possible interferences.

** END OF SECTION **

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for collecting and disposing waste materials encountered in or resulting from the work.

1.2. SYSTEM DESCRIPTION

- 1.2.1. Waste material common to construction shall include but not be limited to the following:
- 1.2.1.1. Solid waste: Equipment and materials resulting from demolition or restoration work, large pieces of asphalt or concrete, trees, stumps, bricks, wire, fences, drums, rubbish and construction debris generated by construction activities and rubble and excess excavated material.
 - 1.2.1.2. Liquid or semi-liquid waste: Cleanings from settling tanks, digesters, lagoons, basins, manholes, sewer mains, and channels including grit, sludge, scum and miscellaneous debris.
- 1.2.2. Contractor shall collect and promptly dispose of all waste materials in the project site. Clean-up shall be done and maintained on a daily basis.
- 1.2.3. All materials and equipment which are not designated as re-usable or salvageable by the owner shall become the property of the Contractor. However, all materials and equipment designated as re-usable or salvageable by the owner shall be carefully removed so as to cause minimum damages and safely stored by the Contractor until accepted by the owner.
- 1.2.4. Waste materials shall not be burned or buried on the work site.
- 1.2.5. On contained work sites such as treatment plants or pumping stations, containers suitable for the collection and disposal of waste shall be provided by the Contractor. On transport piping contracts, collection and disposal shall be a continuous function. The Contractor shall remove all waste materials before moving to other sections of the work.
- 1.2.6. Waste materials shall be disposed of at sites, approved by the NYSDEC Office of Solid Waste Management, which are compatible with the nature of materials being disposed.

- 1.2.7. Waste materials shall be transported by vehicles properly licensed to transport waste by the New York State Department of Environmental Conservation.
- 1.2.8. Disposal of waste materials shall also conform to the applicable requirements of the Sections "Prohibited Construction Procedures" and "Erosion Control", Division 1.

**** END OF SECTION ****

PART 1 GENERAL

1.1. SYSTEM DESCRIPTION

- 1.1.1. Where any of the following abbreviations of standards, associations, specifications or publications are used in the Contract Documents, they shall have the meaning set forth opposite each and shall be the latest revision thereof at the time of bidding.

AA	-	Aluminum Association
AAA	-	Aluminum Alloy Association
AABC	-	Associated Air Balance Council
AAMA	-	Architectural Aluminum
AAN	-	American Association of Nurserymen
AASHTO	-	American Association of State Highway and Transportation Officials
ACGIH	-	American Conference of Governmental Industrial Hygienists
ACI	-	American Concrete Institute
ACPA	-	American Concrete Pipe Association
AFBMA	-	Anti Friction Bearing Manufacturers Association
AGA	-	American Gas Association
AGC	-	Associated General Contractors of America
AGMA	-	American Gear Manufacturers Association
AGWA	-	American Gear Works Association
AHA	-	American Hardboard Association
AI	-	Asphalt Institute
AIA	-	American Institute of Architects
AIEE	-	American Institute of Electrical Engineers
AISC	-	American Institute of Steel Construction
AISI	-	American Iron and Steel Institute
AITC	-	American Institute of Timber Construction
AMCA	-	Air Moving and Conditioning Association
ANSI	-	American National Standards Institute (Synonymous with USASI-ASA)
APA	-	American Plywood Association
API	-	American Petroleum Institute
ARA	-	American Railroad Association
ARI	-	Air Conditioning and Refrigeration Institute
AREA	-	American Railway Engineering Association
ASCE	-	American Society of Civil Engineers
ASHRAE	-	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASLA	-	American Society of Landscape Architects
ASME	-	American Society of Mechanical Engineers
ASTM	-	American Society for Testing and Materials
AWG	-	American (or Brown and Sharpe) Wire Gauge

AWI	-	Architectural Woodwork Institute
AWPA	-	American Wood Preservers Association
AWPB	-	American Wood Preservers Bureau
AWPI	-	American Wood Preservers Institute
AWS	-	American Welding Society
AWWA	-	American Water Works Association
BIA	-	Brick Institute of America
BOCA	-	Building Officials and Code Administrators International
CEMA	-	Conveyor Equipment Manufacturers Association
CGA	-	Compressed Gas Association
CISPI	-	Cast Iron Soil Pipe Institute
CSPC	-	Consumer Product Safety Commission
CRSI	-	Concrete Reinforcing Steel Institute
CSA	-	Canadian Standards Association
CTC	-	Concrete Technology Corporation
DEC	-	New York State Department of Environmental Conservation
DOC	-	United States Department of Commerce
DOD	-	United States Department of Defense
DOT	-	New York State Department of Transportation
EEI	-	Edison Electrical Institute
EJMA	-	Expansion Joint Manufacturers Association
EPA	-	United States Department of Environmental Protection
FHWA	-	Federal Highway Administration, U.S. Dept. of Transportation
FM	-	Factory Mutual Engineering Corporation
FSS	-	Federal Specifications and Standards (General Services Administration -- Federal Supply Service) GA-Gypsum Association
HPMA	-	Hardwood Plywood Manufacturers Association
IBR	-	Institute of Boiler and Radiator Manufacturers
ICBO	-	International Congress of Building Officials
IEEE	-	Institute of Electrical and Electronic Engineers
IES	-	Illuminating Engineering Society
IMIAWC	-	International Masonry Industry All Weather Council
IMSA	-	International Municipal Signal Association
IPCEA	-	Insulated Power Cable Engineers Association
ITE	-	Institute of Traffic Engineers
MBMA	-	Metal Building Manufacturers Association
MMA	-	Monorail Manufacturers Association
MSS	-	Manufacturers Standardization Society
MUTCD	-	Manual on Uniform Traffic Control Devices
NBFU	-	National Board of Fire Underwriters
NBS	-	National Bureau of Standards
NCMA	-	National Concrete Masonry Association
NEBB	-	National Environmental Balancing Bureau
NEC	-	National Electrical Code
NELA	-	National Electric Light Association
NEMA	-	National Electrical Manufacturers Association

NESC	-	National Electrical Safety Code
NFIPA	-	National Fire Protection Association
NFOPA	-	National Forest Products Association
NIOSH	-	National Institute for Occupational Safety and Health
NRMCA	-	National Ready Mix Concrete Association
NSF	-	National Sanitation Foundation
NWMA	-	National Woodwork Manufacturers Association
NYSDEC	-	New York State Department of Environmental Conservation
NYSDOT	-	New York State Department of Transportation
OSHA	-	Occupational Safety and Health Act
PCA	-	Portland Cement Association
PCI	-	Prestressed Concrete Institute
PDI	-	Plumbing and Draining Institute
PEI	-	Porcelain Enamel Institute Incorporated
PPI	-	Plastics Pipe Institute
PRA	-	Public Roads Alphabet
RMA	-	Rubber Manufacturers Association
SAE	-	Society of Automotive Engineers
SDI	-	Steel Door Institute
SJI	-	Steel Joist Institute
SMACNA	-	Sheet Metal and Air Conditioning Contractors National Association
SSPC	-	Steel Structures Painting Council
TPI	-	Truss Plate Institute, Inc.
UL	-	Underwriters Laboratories, Inc.
USSG	-	United States Standard Gauge (for uncoated sheets and thin plates)
USSWG	-	United States Steel Wire Gauge

1.1.2. Where any of the following abbreviations or symbols are used in the Contract Documents, they shall have the meaning set forth opposite each.

1.1.2.1. UNITS OF LINEAR MEASURE

cm. -- Centimeters

in. or " -- Inches

LF, Ft. or ' -- Linear Feet or Feet

Yds. -- Yards

1.1.2.2. UNITS OF SQUARE MEASURE

Sq. cm. -- Square Centimeters

Sq. in. -- Square Inches

Sq. Ft./SF -- Square Feet

SY -- Square Yards

Ac. -- Acres

- 1.1.2.3. UNITS OF CUBIC MEASURE
Cu. in. -- Cubic Inches
Cu. Ft./CF -- Cubic Feet
CY -- Cubic Yards
- 1.1.2.4. UNITS OF LIQUID MEASURE
Pt. -- Pint
Qt. -- Quart
Gal. -- Gallon
Bbl -- Barrel
L. -- Liter
- 1.1.2.5. UNITS OF WEIGHT
Oz. -- Ounces
Lb. or # -- Pounds
Cwt -- Hundredweight or 100 pounds
Kip -- 1000 pounds
gm -- Gram
mg -- Milligram
Kg -- Kilogram
- 1.1.2.6. UNITS OF TEMPERATURE
°F -- Degrees Fahrenheit
°C -- Degrees Centigrade
- 1.1.2.7. UNITS OF FORCE OR PRESSURE
psi -- Pounds per Square Inch
psia -- Pounds per Square Inch Absolute
psig -- Pounds per Square Inch Gauge
psf -- Pounds per Square Foot
ksi -- Kips per Square Inch
ksf -- Kips per Square Foot
tsf -- Tons per Square Foot
- 1.1.2.8. UNITS OF VELOCITY/FLOW
ips -- Inches per Second
fpm -- Feet per Minute
mph -- Miles per Hour
rev -- Revolutions
rpm -- Revolutions per Minute
cfs -- Cubic Feet per Second
cfm -- Cubic Feet per Minute
gpm -- Gallons per Minute
mgd -- Million Gallons per Day

- 1.1.2.9 UNITS OF TIME
Sec. -- Seconds
Min. -- Minutes
Hrs. -- Hours
- 1.1.2.10. UNITS OF ANGULAR MEASUREMENT
Sec. or " -- Seconds
Min. or ' -- Minutes
Deg. or ° -- Degrees
- 1.1.2.11. UNITS OF CONCENTRATION
ppm -- Parts per Million
Kg/l -- Kilograms per Liter
mg/l -- Milligrams per Liter
- 1.1.2.12. UNITS OF POWER
hp -- Horsepower
bhp -- Brake Horsepower
- 1.1.2.13. MATERIALS
ABS -- Acrylonitrile Butadiene Styrene
ACCMP -- Asphalt Coated Corrugated Metal Pipe
ACP -- Asbestos Cement Pipe
BIT -- Bituminous
CIP -- Cast Iron Pipe
CISP -- Cast Iron Soil Pipe
CONC -- Concrete
CPVC -- Chlorinated Polyvinyl Chloride
DIP -- Ductile Iron Pipe
CLDIP -- Cement Lined Ductile Iron Pipe
GLDIP -- Glass Lined Ductile Iron Pipe
HDPE -- High Density Polyethylene
PCCP -- Prestressed Concrete Cylinder Pipe
PE -- Polyethylene
PVC -- Polyvinyl Chloride
RCP -- Reinforced Concrete Pipe
SST -- Stainless Steel
CU -- Copper
TCP -- Terra Cotta Pipe
VCP -- Vitrified Clay Pipe

1.1.2.14.

MISCELLANEOUS

B&B -- Balled and Burlapped

BR -- Bare Root

CPM -- Critical Path Method

CTS -- Copper Tube Size

Div. -- Division

ID or OD -- Inside Diameter or Outside Diameter

IPS -- Iron Pipe Size

NPT -- National Pipe Thread

ODS -- Oven Dried Solids

pH -- Measure of Acidity or Alkalinity

1.1.2.15.

ELECTRICAL

A -- Amperes

AC -- Alternating Current

DC -- Direct Current

V -- Volts

Hz -- Hertz

KvA -- Kilovolt Amperes

KW -- Kilowatts

MA -- Milliamps

1.1.2.16.

MECHANICAL

NPSH -- Net Positive Suction Head

TDH -- Total Dynamic Head

BTU -- British Thermal Units

K -- Thermal Conductivity -- BTU/(hr) (FT²) (Degree F/Ft) (°F/Ft)

C -- Thermal Conductance -- BTU/(hr) (FT²) (Degree F) (°F)

U -- Coefficient of Heat Transmission -- BTU/(hr) (FT²) (Degree F) (°F)

R -- Thermal Resistance -- (hr) (FT²) (Degree F)/BTU (°F)/BTU

**** END OF SECTION ****

PART 1 GENERAL

1.1 SECTION INCLUDES

- 1.1.1. Requirements for determining measurement and payment of work in place and for determining measurement and payment of materials and equipment delivered but not incorporated in the work.

1.2 SYSTEM DESCRIPTION

- 1.2.1. The requirements in this section are supplementary to the General Conditions.

- 1.2.2. Unit Price Items and Unit Price Contracts.

- 1.2.2.1. Measurement of units of work for which payment will be made by unit prices will be defined in Part Four of the respective Sections for only those items of work which appear in the bid form.
- 1.2.2.2. Payment for the units of work will be determined by multiplying the unit prices stated within the bid, times the quantity of the unit of work as determined by the measurement provisions of Part Four of the respective Sections. Payment for the units of work shall fully compensate the contractor for furnishing all materials, labor, equipment, services, tools and all else incidental and necessary to complete the work.

- 1.2.3. Lump Sum Items and Lump Sum Contracts.

- 1.2.3.1. Measurement of quantities of work will be as indicated on the accepted schedule of values.
- 1.2.3.2. Payment for the quantities of work indicated in the accepted schedule of values will be at the prices stated in the accepted schedule of values, not to exceed the lump sum stated within the bid. Payment for the work to be performed under the lump sum shall fully compensate the contractor for furnishing all material, labor, equipment, services, tools and all else incidental and necessary to complete the work.

- 1.2.4. No specific measurement and payment will be made for units of work described in Sections not including a Part Four, or for those items which include a Part Four but are not contained in the bid form, but the costs thereof shall be included in the prices bid for the various other items in the bid.

** END OF SECTION **

SECTION 01153
CHANGE ORDER PROCEDURE

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for preparing and submitting of required information for change orders.

1.2. SYSTEM DESCRIPTION

- 1.2.1. Requirements of this Section are supplemental to General Conditions.
- 1.2.2. Contractor shall provide such information as the Engineer may require for preparation of the change order including but not limited to the following:
- 1.2.2.1. Itemized description of the addition, deletion or revision in the work.
 - 1.2.2.2. Itemized description of the change in the contract price including documentation.
 - 1.2.2.3. Description of the change in the contract time. Time extensions shall be allowed only when conditions causing the delay are beyond the control of the Contractor. Any change in the contract time will only be effected when demonstrated that the approved project schedule has been implemented as described in the Section "Progress Schedules," of the General Conditions.
- 1.2.3. Change orders shall be in the form as indicated on Page L-1 of the Contract Documents.

** END OF SECTION **

SECTION 01201
PRECONSTRUCTION CONFERENCE

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for contractor to attend a preconstruction conference.

1.2. SYSTEM DESCRIPTION

- 1.2.1. This Section is supplemental to the general condition section "Preliminary Matters."
- 1.2.2. A preconstruction conference will be held at a time and location set by the Engineer to establish various procedures that will be followed for the duration of the construction period and to review the contractor's construction schedule and schedule of shop drawing and sample submissions.
- 1.2.3. The Engineer will preside at the preconstruction conference and will prepare for distribution minutes that describe the major topics of discussion.
- 1.2.4. In addition to the items that will be reviewed in accordance with general conditions, the preconstruction conference agenda will include but not be limited to:
- 1.2.4.1. Designation of contractor's responsible personnel and phone numbers to be used in event of an emergency during non-working hours.
 - 1.2.4.2. Designation of Contractor's competent safety person that will be on the job as required by OSHA.
 - 1.2.4.3. Disclosure of contractor's intended suppliers, vendors, fabricators and major subcontractors.
 - 1.2.4.4. Contractor shall supply preliminary construction schedule as developed in accordance with Section 01310.
 - 1.2.4.5. Contractor shall supply schedule of values for lump sum items.
 - 1.2.4.6. Procedures for the implementation of field orders and change orders.
 - 1.2.4.7. Contractor's insurance.
 - 1.2.4.8. Procedures for contacting and requirements for providing access for local fire and first aid companies, police, bus companies and local traffic.

- 1.2.4.9. Site security.
- 1.2.4.10. Housekeeping.
- 1.2.4.11. Field offices.
- 1.2.4.12. Record drawings.
- 1.2.4.13. Job site coordination.
- 1.2.4.14. Protection of utilities.
- 1.2.4.15. Other topics pertinent to the work that may be presented by conference attendants.

1.2.5. Preconstruction conference attendants will be as follows:

- 1.2.5.1. Owner.
- 1.2.5.2. Engineer.
- 1.2.5.3. Contractor and major subcontractors.
- 1.2.5.4. Governmental agency representatives, utility owner representatives and other parties who may have control of, or may be affected by the work.

**** END OF SECTION ****

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for Contractor to attend a progress meetings.

1.2. SYSTEM DESCRIPTION

- 1.2.1. The Contractor and/or Contractor's representatives shall attend regularly scheduled progress meetings held for the purpose of coordinating the execution of the work.
- 1.2.2. The Engineer will preside at the progress meetings.
- 1.2.3. The proceedings of these meetings will be recorded by the Project Engineer and the Contractor will be furnished a reasonable number of copies of the meeting minutes.
- 1.2.4. During the project meetings the Contractor shall provide updated schedules concerning his plans for carrying out each part of the work.
- 1.2.5. The Contractor shall provide a list of all items which are impacting the completion of the work (i.e. decisions required, easements required, shop drawing approvals required, etc.).
- 1.2.6. As the work progresses, the Contractor's actual progress rate will be compared to the scheduled progress rate.

1.3. QUALITY ASSURANCE

- 1.3.1. The Contractor's representatives at these meetings shall be empowered to make binding decisions regarding all matters pertaining to the work and to make definite reports as to status and anticipated progress of the work.

1.4. SEQUENCING/SCHEDULING

- 1.4.1. Progress meetings shall be scheduled at least bi-weekly and more frequently if the Engineer decides more frequent meetings are required.

** END OF SECTION **

SECTION 01310
PROGRESS SCHEDULES

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for preparing and submitting progress schedules to the Owner and Engineer review.

1.2. GENERAL

- 1.2.1. A CPM (Critical Path Method) arrow-node diagram shall be employed for the planning, scheduling, and reporting of all work to be performed under the contract.
- 1.2.2. The CPM diagram shall be part of the Owner/Contractor agreement as stipulated herein.
- 1.2.3. The CPM diagram shall be prepared and updated by the Contractor as required.

1.3. INITIAL SUBMIT

- 1.3.1. Within ten (10) days after the effective date of the agreement, the Contractor shall provide a preliminary CPM arrow-node diagram to the Engineer. The Contractor's plan of operations shall consist of, but not be limited to, the following, with the understanding that unless otherwise approved, the sequence of work shall be as outlined and required in the contract documents.
- A. All construction activities including major procurement items.
 - B. Proposed durations for each of the construction activities. Diagram shall also show early start time, latest allowable start time, estimated duration for activity, early finish time, latest allowable finish time, and total float for each activity.
 - C. Proposed sequencing of construction activities.
 - D. The critical path through the activities.
 - E. Estimated manpower per activity.

1.4. FINAL PROGRESS SCHEDULE

- 1.4.1. Within ten (10) days of the submittal of the preliminary CPM diagram (arrow-node diagram), and after review by the Engineer, the Contractor shall develop the final CPM diagram, based on the Contractor's proposed plan of operation. The purpose of the plan and schedule shall be to assure adequate planning and execution of the work by the Contractor; to assure coordination of the work by the Contractor; to assure coordination of the work of the various contractors; and to assist the Engineer in monitoring the progress of the work, establish payments to the Contractor, and evaluate proposed changes to the contract and schedule.
- 1.4.2. In preparing the CPM diagram, the Contractor shall be responsible for assuring that all subcontractor work, as well as his own work, is included in the network diagram, that work sequences are logical, and that the diagram shows a coordinated plan of work.
- 1.4.3. The CPM diagram as developed shall show the sequence and interdependence of activities required for completion of the work. In developing the CPM diagram, the work shall be divided into activities with a minimum and maximum duration of working days shown for each activity.
- 1.4.4. Proposed durations assigned to each activity shall reflect the Contractor's best estimate of time required to complete the activities considering the scope and resources planned for the activity; these shall be furnished by the Contractor for each activity.
- 1.4.5. Failure by either the Contractor to include any element of work required for performance of the contract shall not excuse the Contractor from completing all work within the contract completion date. If the Engineer questions the Contractor's proposed durations, the Contractor shall within ten (10) calendar days provide estimates of labor and intended crew sizes required for the activity which supports the proposed duration to the satisfaction of the Engineer.
- 1.4.6. Seasonal weather conditions shall be considered in the planning and scheduling of all work influenced by high or low ambient temperatures to insure the completion of all contract work within the allotted contract time milestone completion dates.
- 1.4.7. Holidays and week ends shall be considered in the planning and scheduling of all work.

1.5. REVIEW AND APPROVAL

- 1.5.1. Upon establishment of an agreed upon schedule, the Contractor shall sign the CPM diagram, which will then indicate the acceptance and approval of the project schedule, sequence of activities, times for completion, and manpower. **Acceptance of the approved project schedule by the Contractor and Engineer will be a condition precedent to the making of any payments under the contract.**

1.6. PROJECT SCHEDULE UPDATING

- 1.6.1. The approved project schedule will be updated every two weeks for the purpose of recording and monitoring the progress of work. The Contractor shall submit to the Engineer each two week period actual progress made-to-date, dates of activities started and completed, and the percentage of work completed-to-date on each activity started but not completed.**
- 1.6.2. The Contractor may request revision to the logic sequence and schedule in the event his planning for the project is revised. If the Contractor desires to make changes in the approved project schedule to reflect revisions in his method of operation and scheduling, he shall notify the Engineer in writing, and submit proposed revisions.**
- 1.6.3. Updating the schedule to reflect actual progress made up to the date of an update shall not be considered revisions to logic sequence and schedule; in case of disagreements concerning actual progress-to-date, the Engineer's determination shall govern.**
- 1.6.4. The Contractor shall notify the owner and Engineer 48-hours in advance of any changes in work schedule.**

1.7. CONTRACT TIME CHANGE EVALUATION

- 1.7.1. Activity time delays will not automatically mean that an extension of contract time is warranted or due the Contractor. It is possible that a strike or contract modification will not affect existing critical activities, or cause non-critical activities to become critical, i.e., a strike modification may result in only absorbing part of the available total float that may exist within an activity, thereby not causing any effect on the contract completion date or time. Float or slack is not the exclusive use of or benefit of either the Owner or the Contractor.**

1.8. RESPONSIBILITY FOR COMPLETION

- 1.8.1. The Contractor shall furnish sufficient forces, plant and equipment, and shall work such hours, to ensure the procession of the work in accordance with the current update of the project schedule. If, in the opinion of the Engineer, the Contractor falls behind in meeting the schedule as presented in the current update, the Contractor shall take such steps as may be necessary to improve his progress, and the Engineer may require him to increase the hours of work, the number of shifts, and the amount of construction plant and equipment without additional cost to the Owner.**

- 1.8.2. Failure of the Contractor to comply with the requirements of this subsection shall be a basis for determination by the Owner that the Contractor is not prosecuting the work with such diligence as will ensure completion within the time stipulated. Upon such determination, the Owner may terminate the Contractor's right-to-proceed with the work or any separate part thereof, or may take such other actions as may be deemed appropriate.
- 1.8.3. It shall be the responsibility of the Contractor to maintain his progress so as not to delay the progress of the project or the progress of other contractors. If the Contractor delays the progress of the project or the progress of other contractors, it shall be the responsibility of the Contractor to increase the number of shifts, days of work, and, to the extent permitted by law, to institute or increase overtime operations, all without additional cost to the Owner, to regain the time lost and to maintain the overall schedule.

**** END OF SECTION ****

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for preparing and submitting shop drawings and samples to Engineer for review.

1.2. SYSTEM DESCRIPTION

- 1.2.1. Requirements of this Section are supplemental to General and Special Conditions.
- 1.2.2. Contractor shall submit to the Engineer shop drawings, certified tests, and manufacturer's specifications for equipment and material being supplied under this Contract. Shop drawings shall also be submitted for piping, miscellaneous metal, structural steel, reinforcing steel, tools and furnishings, and all fabricated items. Samples of materials furnished by the Contractor to be incorporated in the work shall also be submitted. The Contractor shall submit this data with such promptness as to avoid delay in the work, allowing reasonable time for the engineer's review and approval.
- 1.2.3. Details on shop drawings submitted for review shall clearly show the relation of the various parts and, where the work depends upon field measurement, such measurements shall be obtained by the Contractor and noted on shop drawings before being submitted for review.
- 1.2.4. Drawings submitted by Subcontractors or manufacturers shall be sent directly to the Contractor for approval. The Contractor shall be responsible for their submission to the Engineer. **The Contractor shall thoroughly check all subcontractors' or manufacturers' shop drawings regarding measurements, sizes of members, materials and details to verify that they conform to the drawings and specifications and acknowledge same by so stamping and signing the drawings. Drawings found to be inaccurate or otherwise in error shall be returned by the Contractor for correction before submitting to the Engineer. Shop drawings not stamped and signed by the Contractor shall be returned for Contractor's stamp and signature prior to review by Engineer.**
- 1.2.5. The Contractor shall coordinate reviewed equipment shop drawings with shop drawings of related new and altered structures, including but not limited to connecting details, supports, piping, electrical and mechanical work to insure proper accommodation of the furnished equipment.

- 1.2.6. Submissions shall be properly referenced to indicate clearly the specification section, drawing number, location, service and function of each particular item. All submissions for one item or group of related items shall be complete. Where manufacturer's publications in the form of catalogs, pamphlets or other data sheets are submitted instead of prepared shop drawings, such submissions shall specifically indicate the item for which review is required. Identification of items shall be made in ink and submissions showing only general information are not acceptable.
- 1.2.7. All materials furnished by the Contractor to be incorporated in the work shall be subject to the review and inspection of the Engineer. No material shall be processed or fabricated for, or delivered to, or used for the work without prior review and approval by the Engineer.
- 1.2.8. Prior to beginning and during the progress of the work as required, the Contractor shall submit samples of materials for such specific tests as may be necessary to demonstrate that the materials conform to the specifications. Samples shall be furnished, taken, stored, packed and shipped where directed, at the expense of the Contractor.
- 1.2.9. Samples shall be packed so as to reach their destination in good condition, and shall be so labeled as to indicate the materials represented, the name of the facility or work and location for which the material is intended, and the name of the supplier submitting the sample. To ensure consideration of samples, the Contractor shall notify the Engineer by letter that the samples have been shipped, and shall properly describe the samples in the letter. In no case shall the letter of notification be enclosed with the samples.
- 1.2.10. The Contractor shall submit to the Engineer notarized certifications of compliance with the Contract Documents from all material suppliers.
- 1.2.11. The Engineer's review will be confined to general arrangement and compliance with the Contract Documents only and will not be for the purpose of checking dimensions, weights, clearances, fittings, tolerances, interferences or coordination of trades.
- 1.2.12. The Contractor is advised that color selections when required for items such as, but not limited to special coatings, glazed masonry block, resinous flooring, ceramic tile and the like will only be made by the Engineer when all samples and color chips for all such items are received. Contractor shall schedule his submission of these items to coincide as much as practical to allow the Engineer to coordinate the color selections.

1.3. SUBMITTALS

- 1.3.1. Submittals shall be a minimum of 8½" x 11" and a maximum size of 24" x 36".
- 1.3.2. For submittals up to and including 11" x 17", the Contractor shall submit four copies.
- 1.3.3. For submittals larger than 11" x 17", the Contractor shall submit the original tracings or reproducible reproductions or the tracings and four sets of prints. Reproducible reproductions shall be submitted with a matte finish working surface.
- 1.3.4. Submittals with inadequate information to allow evaluation or review will be returned for resubmission. Resubmission with additional data does not guarantee approval.
- 1.3.5. The Engineer will return two copies of shop drawings to the Contractor, bearing a stamp with the following language and marked appropriately:

☐ NO EXCEPTION TAKEN ☐ REVISE AND RESUBMIT

☐ FURNISH AS CORRECTED ☐ REJECTED SEE REMARKS

Corrections or comments made on the shop drawings during this review do not relieve contractor from compliance with requirements of the drawings and specifications and does not authorize any changes involving additional cost. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of all other trades; and performing his work in a safe and satisfactory manner.

LANC & TULLY ENGINEERING AND SURVEYING, P.C.

Date _____

By _____

- 1.3.6. Copies returned marked "Approved" or "Furnish As Corrected" shall be for the Contractor's use and no additional copies need be submitted. Copies returned marked "Revise and Resubmit" shall be corrected by the Contractor and resubmitted in the same manner and number of copies as the original submission. Copies returned marked "Rejected See Remarks" do not conform to the design concept of the project or comply with the information given in the Contract Documents and shall not be resubmitted. New submittals shall be required.

- 1.3.7. Should the Contractor propose a revision to a previously submitted and reviewed shop drawing, the same shall be submitted in the manner and number of copies as the original submission. The resubmission shall clearly indicate, in a revision block, the date, description and location of the revision. The letter of transmittal shall state the reasons for the revision.

**** END OF SECTION ****

SECTION 01341
REVIEW OF CONTRACTOR'S CONSTRUCTION PROCEDURES

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for submitting Contractor's construction procedures for review.

1.2. SYSTEM DESCRIPTION

- 1.2.1. When submittal of any means, methods, sequences and procedures of construction is requested in the Contract Documents or by the Engineer, it will be for the purpose of informing the Engineer and the owner of the intended procedures of construction and will be in the context of the responsibilities of the Contractor, Owner and Engineer stated in the General Conditions.
- 1.2.2. The Engineer shall not be responsible to respond to the submittal of any means, methods, sequences and procedures of construction.
- 1.2.3. Submittals shall be made sufficiently in advance of the work to allow for Engineer's review.

1.3. SUBMITTALS

- 1.3.1. Contractor shall submit three copies of intended procedures of construction.

** END OF SECTION **

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1 Furnishing all materials, labor, equipment, power and maintenance, etc. to implement a temporary pumping system for the purpose of diverting the existing flow around the work area for the duration of the project.
- 1.1.2 Design, installation, and operation of the temporary pumping system shall be the Contractor's responsibility. The Contractor shall employ the services of a vendor who can demonstrate to the engineer that the vendor specializes in the design and operation of temporary bypass pumping systems. The vendor shall provide at least two (2) references of projects of a similarly size and complexity as this project performed by his firm within the past three years, upon request. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction as supplied by the contractor.

1.2. SYSTEM REQUIREMENTS

- 1.2.1 The Contractor shall prepare with the vendor a specific, detailed description of the proposed pumping system and submit it and the vendor's references.
- 1.2.2 The contractor shall submit to the Engineer detailed plans and descriptions outlining all provisions and precautions to be taken by the Contractor regarding handling of existing wastewater flows. This plan must be specific and complete, including such items as schedules, locations, elevations, capacities of equipment, materials, and all other incidental items necessary and/or required to ensure proper protection of the facilities, including protection of the access and bypass pumping locations from damage due to the discharge flows. No construction shall begin until all provisions and requirements have been reviewed by the Engineer.
- 1.2.3 The plan shall include but not be limited to the details of the following:
 - 1. Staging areas for pumps.
 - 2. Sewer plugging method and types of plugs.
 - 3. Size and location of manholes or access points for suction and discharge hose or piping.
 - 4. Size of pipeline or conveyance system to be bypassed.
 - 5. Number, size, material, location and method of installation of suction piping.
 - 6. Number, size, material, method of installation and location of installation of discharge piping.

7. Bypass pump sizes, capacity, number of each size to be on site and power requirements.
8. Calculations of static lift, friction losses, and flow velocity (pump curves showing pump operating range shall be submitted)
9. Standby power generator size, location
10. Downstream discharge plan
11. Method of protecting discharge manholes or structures from erosion and damage.
12. Thrust and restraint block sizes and locations.
13. Sections showing suction and discharge pipe depth, embedment, select fill and special backfill.
14. Method of noise control for each pump and/or generator
15. Any temporary pipe supports and anchoring requirements.
16. Design plans and computation for access to bypass pumping locations indicated on the drawings.
17. Calculations for selection of bypass pumping pipe size.
18. Schedule for installation of and maintenance of bypass pumping lines.
19. Plan indicating selection of location of bypass pumping lines locations.

1.3. SYSTEM DESCRIPTION

1.3.1 Design Requirements

1. Bypass pumping systems shall have sufficient capacity to handle maximum flow being bypassed.
2. The Contractor shall provide all pipeline plugs, pumps of adequate size to handle peak flow, and temporary discharge piping to ensure that the total flow of the main can be safely diverted around the section to be repaired. Bypass pumping systems shall only be operated during working hours, with temporary connections between the old and new sewer system made during non-working hours, to ensure continual operation of the sewer system.
3. The Contractor shall have adequate standby equipment available and ready for immediate operation and use in the event of an emergency or breakdown. One standby pump for each size pump utilized shall be installed at the mainline flow bypassing locations, ready for use in the event of primary pump failure.
4. Bypass pumping system shall be capable of bypassing the flow around the work area and be sized to handle any amount of flow up to full available flow as defined by the Owner into the work area as necessary for satisfactory performances of work.

5. The Contractor shall make all arrangements for bypass pumping during the time when the main is shut down for any reason. System must overcome any existence force main pressure on discharge.

1.3.2 Performance Requirements

1. It is essential to the operation of the existing system being bypassed that no interruptions in the flow occur throughout the duration of the project. To this end, the Contractor shall provide, maintain, and operate all temporary facilities such as dams, plugs, pumping equipment (both primary and back-up units as required), conduits all necessary power, and all other labor and equipment necessary to intercept the incoming flow before it reaches the point where it would interfere with his work, carry it past the work area and return it to the existing system downstream of his work.
2. The design, installation and operation of the temporary pumping system shall be the Contractor's responsibility. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.
3. The Contractor shall provide all necessary means to safely convey the sewage past the work area. The Contractor will not be permitted to stop or impede the main flows under any circumstances.
4. The Contractor shall divert the flow around the work area in manner that will not cause damage to or surcharging of customers system and will protect public and private property from damage and flooding.
5. The Contractor shall protect water resources, wetlands, and other natural resources.

PART 2 PRODUCTS

2.1 EQUIPMENT

- 2.1.1 All pumps used shall be fully automatic self-priming units that do not require the use of foot-valves or vacuum pumps in the priming system. The pumps may be electric or diesel powered. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of effluent flows.
- 2.1.2 The Contractor shall provide the necessary stop/start controls for each pump.
- 2.1.3 The Contractor shall include one stand-by pump of each size to be maintained on site. Back up pumps shall be online, isolated from the primary system by a valve.

- 2.1.4 It is recommended that the pump be contained inside a temporary portable berm or secondary containment to contain any fuel or sewage that may spill during the normal course of operation.
- 2.1.5 Discharge Piping – In order to prevent the accidental spillage of flows, all discharge systems shall be temporarily constructed of rigid pipe with positive, restrained joints. Under no circumstances will “irrigation” type piping or glued PVC pipe be allowed. Discharge hose will only be allowed in short sections and by specific permission from the engineer.
- 2.1.6 Any piping found to be leaking shall be immediately taken out of service and replaced at Contractor’s cost.

PART 3 EXECUTION

3.1 FIELD QUALITY CONTROL AND MAINTENANCE

- 3.1.1 Test: Contractor shall perform leakage and pressure tests of the bypass pumping discharge piping using clean water prior to the actual operation. The Engineer will be given 24 hours notice prior to testing.
- 3.1.2 Inspection: Contractor shall inspect bypass-pumping system on a continuous basis to ensure the system is working correctly.
- 3.1.3 Maintenance Service:
 - 1. Contractor shall ensure the temporary pumping system is properly maintained and a responsible operator shall be on hand at all times when pumps are operating.
 - 2. Contractor shall monitor pump fuel levels if required and make arrangements for timely refueling as needed.

3.2 PREPARATION

3.2.1 Precautions:

- 1. Contractor is responsible for locating any existing utilities in the area selected for the bypass pipelines. The Contractor shall locate his bypass pipelines to minimize any disturbance to existing utilities, private property, and structures, and shall obtain approval of the pipeline locations from the Owner. All costs associated with relocating utilities, if necessary, and obtaining all approvals shall be paid by the Contractor.

2. During all bypass-pumping operations, the Contractor shall protect the Owner's system (Pumping Station, Conveyance System, Etc.) as applicable from damage inflicted by any equipment. The Contractor shall be responsible for all physical damage to the Owner's system caused by human or mechanical failure.

3.3 INSTALLATION AND REMOVAL

- 3.3.1 Plugging or blocking of flows shall incorporate a primary or secondary plugging device. When plugging or blocking is no longer needed for performance and acceptance or work, it is to be removed in a manner that permits the sewage flow to slowly return to normal without surge, to prevent surcharging or causing other major disturbances downstream.
- 3.3.2 When working inside manhole or force main, the Contractor shall exercise caution and comply with OSHA requirements when working in the presence of sewer gases, combustible or oxygen-deficient atmospheres, and confined spaces.
- 3.3.3 The installation of the bypass pipelines is prohibited in all wetland areas. The pipeline must be located if possible off streets and sidewalks and on shoulders of the roads. When the bypass pipeline crosses local streets and private driveways, the Contractor must place the bypass pipelines in trenches and cover with temporary pavement. Upon completion of the bypass pumping operations, and after receipt of written permission from the Customer, the Contractor shall remove all the piping, restore all property to pre-construction condition, and restore all pavements. The Contractor is responsible for obtaining any approvals for placement of the temporary pipeline from the Owner.

PART 4 MEASUREMENT AND PAYMENT

4.1. MEASUREMENT

- 4.1.1. Measurement for by-pass pumping shall be lump sum for entire project, regardless of how many times contractor must set up a by-pass system, or length of by-pass required.

4.2. PAYMENT

- 4.2.1. Lump Sum price for by-pass pumping shall include inspection of entire project site; design of by-pass pumping system at each location required; supplying and set up of pump(s); supplying and set up of hoses and piping required to establish by-pass; equipment; labor; temporary tie-in connections for use during non-working hours; breakdown of pump, hoses, and piping upon completion; construction temporary ramping over by-pass lines to allow for unrestricted flow of traffic; disposal of surplus and unsuitable material; restoration; and all else incidental and necessary to complete the work.

**** END OF SECTION ****

SECTION 01516
TEMPORARY SANITARY FACILITIES

PART 1 GENERAL

1.1. SECTION INCLUDES

1.1.1. Requirements for providing temporary sanitary facilities.

1.2. SYSTEM DESCRIPTION

1.2.1. The Contractor shall provide, maintain and remove when no longer required, an adequate number of temporary, prefabricated, chemical type toilets with proper enclosures for the use of workmen during construction. Toilets shall be cleaned at least twice a week.

1.2.2. Keep toilets clean and supplied with toilet paper at all times. Comply with all Local and State Health Requirements and Sanitary Regulations.

1.3. SEQUENCING/SCHEDULING

1.3.1. Contractor shall provide these facilities as soon as a work force is active at the site.

** END OF SECTION **

SECTION 01546
PROTECTION OF EXISTING PROPERTY

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for protecting existing public and private property on or in the vicinity of the work site and the handling of claims and complaints arising as a result of the work.

1.2. SYSTEM DESCRIPTION

- 1.2.1. Requirements of this section are supplemental to General Conditions Section "Contractor's Responsibilities."
- 1.2.2. Contractor shall take all necessary precautions for the safety of and shall provide the necessary protection to prevent damage, injury or loss to all public and private property not designated for removal, relocation or replacement in the course of construction. The Contractor shall not damage or disturb existing or future structures adjacent to the construction easement.
- 1.2.3. During construction, if it is necessary to temporarily remove any existing services, they shall be reconnected the same day or temporary services shall be provided. **Affected owners shall be notified 48 hours prior to disruption of service.**
- 1.2.4. Contractor shall protect the natural vegetation and other existing landscape features and surroundings. Where practical, trees shall be protected to the drip-line as shown in the Standards for Soil Erosion and Sediment Control as published by the State Soil Conservation Committee. If damage occurs to a tree's root system within the drip-line, the tree shall be pruned accordingly using accepted tree surgery techniques to compensate for the loss of root system. Damages to tree trunks, limbs, bark and roots shall be repaired using accepted tree surgeon methods.
- 1.2.5. All grass areas beyond the construction limits damaged by the Contractor shall be repaired using seeding methods and materials equal to or better than that which existed prior to construction.
- 1.2.6. Where damage or injury or loss is done to public or private property as a result of the Contractor's execution of the work, such property shall be restored by the Contractor at his expense to a condition equal to or better than that existing prior to the damage.

- 1.2.7. Where property has existing damages that cannot be clearly verified by the preconstruction photographs or video tapes previously submitted, the nature and extent of such damages shall be documented and submitted to the Engineer prior to any construction or construction related activity.
- 1.2.8. Damages to curbs, sidewalks, driveways, lawns, shrubbery, property, monuments or other property that are not documented as pre-existing and do not show on the preconstruction photographs or video tapes, will be viewed as a result of the Contractor's execution of the work and shall be repaired in a manner acceptable to the Engineer. The Contractor shall, at his own expense, take such additional photographs as may be required to document damage which exists prior to construction.

1.3. QUALITY ASSURANCE

- 1.3.1. Survey markers removed or disturbed by the Contractor's Operations shall be reset by a Licensed Land Surveyor registered in the State of the project. Such surveyor shall certify to the Owner that reset markers are located at the same location and/or elevation as they were prior to their removal or disturbance.
- 1.3.2. The Contractor shall expeditiously and satisfactorily resolve all claims and complaints arising as a result of work under this Contract. The Contractor shall provide the services of an authorized representative during normal working hours for the purpose of handling all such claims and complaints. A file shall be maintained to log all claims and complaints and shall include the date and time, person filing the claim or complaint, nature and extent of the claim or complaint, and its resolution. The Contractor must advise the owner monthly in writing of all such claims and complaints received by him including the status of each and for each claim or complaint that has been secured by his insurance company, proof that such has been done.
- 1.3.3. The Contractor shall pay for all costs to handle and resolve all claims or complaints. If within 30 days of receipt of a complaint, the Contractor fails to settle or secure any claim or complaint, the owner may retain such amounts of money from payments that would otherwise be due the Contractor as, in the opinion of the owner, may be required to settle all claims filed with the owner.

1.4. SUBMITTALS

- 1.4.1. The Contractor will submit to the Engineer lists of damages to property that exist prior to construction or construction related activity. The list shall include the following information:
- Location of damage by station or address
 - Nature of damage
 - Extent of damage
 - Color photographs of damage
- 1.4.2. Lists shall be submitted sufficiently in advance in order that the Engineer can verify the damages.

**** END OF SECTION ****

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for controlling noise levels resulting from construction activities.

1.2. SYSTEM DESCRIPTION

- 1.2.1. The Contractor shall control the noise generated by his construction operations.
- 1.2.2. Noise caused by construction activities shall not exceed the levels permitted by applicable Federal, State or local regulations.
- 1.2.3. All construction equipment powered by an internal combustion engine shall be equipped with a properly maintained muffler.
- 1.2.4. Air compressors shall be operated in accordance with the manufacturer's instructions for proper noise abatement.
- 1.2.5. Air powered equipment shall be fitted with pneumatic exhaust silencers.
- 1.2.6. Stationary equipment powered by an internal combustion engine shall not be operated within 150 feet of noise sensitive sites without temporary noise barriers placed between the equipment and the noise sensitive sites. Noise sensitive sites shall include residential buildings, motels, hotels, schools, churches, hospitals, nursing homes, libraries and public recreation areas. Temporary noise barriers shall be constructed of plywood or tongue and groove boards with a noise absorbent treatment on the interior surface (facing the equipment).
- 1.2.7. Unless otherwise permitted by the owner in times of an emergency, powered construction equipment shall not be operated before 7:30 am or after 5:00 pm.
- 1.2.8. Unless otherwise permitted by the owner in times of an emergency, driving, pulling or other operations entailing the use of vibratory hammers or use of vibratory compactor shall not be permitted before 8:00 am or after 5:00 pm within 100 feet of a noise sensitive site.

**** END OF SECTION ****

SECTION 01562
DUST CONTROL

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for controlling generation and dispersal of dust.

1.2. SYSTEM DESCRIPTION

- 1.2.1. The Contractor shall conduct his operations and maintain the area of his activities so as to minimize the creation and dispersion of dust.
- 1.2.2. The Contractor shall sprinkle with water and calcium chloride to control dust in unpaved streets, trench areas or excavation sites on a daily basis.
- 1.2.3. Areas under immediate construction (including access roads and other affected areas) will be swept clean and wet down sufficiently to lay dust at the end of each day. In addition, these areas will be wet down during non-working hours (including weekends) as often as required to keep the dust under control.
- 1.2.4. If, in the opinion of the Engineer, the Contractor is not maintaining adequate dust control, the Engineer will notify the Contractor who shall promptly provide whatever methods and means are necessary to bring the dust under control.
- 1.2.5. In the event of restricted water use in the municipality at the time of bid, the Contractor shall obtain, pay for and transport water from his own sources as required.

** END OF SECTION **

PART 1 GENERAL

1.1. SECTION INCLUDES

1.1.1. Requirements for controlling erosion as a result of the work.

1.2. SYSTEM DESCRIPTION

- 1.2.1. Contractor shall control erosion of earth and sediment runoff resulting from the work. Erosion control measures shall comply with the publication "New York Standards and Specifications for Erosion and Sediment Control".
- 1.2.2. Erosion as a result of surface drainage from cuts and fills within the construction limits, whether or not completed, and from staging, stockpile, borrow and waste disposal areas, shall, if turbidity producing materials are present, be held in suitable sedimentation basins or shall be graded to control erosion. Temporary erosion and sediment control measures including but not limited to berms, dikes, drains, soil stabilization matting, diversion channels, baled hay or straw, silt fences, catch basin protection, and sedimentation basins, shall be provided and maintained as required to meet the referenced standards.
- 1.2.3. Along slopes and designated critical erosion or siltation areas, clearing and grubbing operations shall be delayed until absolutely necessary for the continuation of the work so that the area of exposed, bare soil subject to erosion is minimized.
- 1.2.4. All temporary erosion control measures shall be in place prior to any grading or excavation operations and shall be left in place or replaced as required to retain their desired effectiveness until the construction is completed and the area is stabilized.
- 1.2.5. All excavated material, when excavating parallel to streams, wetland habitats, and other critical impact areas, shall be deposited on the up-slope side of the excavation.
- 1.2.6. Stockpiled material shall not have side slopes in excess of 3:1. Stockpiled material shall be protected from erosion by the use of mulch, jute netting, grass seeding, hay bales, or similar material.

- 1.2.7. Contractor shall select stockpile areas in areas where a minimum of erosion sediment will reach catch basins, streams, lagoons or other receiving systems. Only environmentally suitable stockpile sites shall be used for the purpose of storing materials, equipment and spoils. Suitable sites shall be level, devoid of mature stands of natural vegetation, and removed from drainage facilities and features, wetlands and stream corridors. Protect stockpile areas from erosion by wind or water.
- 1.2.8. Contractor shall periodically during construction remove sediment from all receiving systems where material has been deposited as a result of his operations in the performance of the work. Upon completion of the work, all affected areas shall be restored.
- 1.2.9. Contractor shall submit intended plans for erosion and sediment control at the preconstruction conference.
- 1.2.10. Whenever excess excavated material is disposed of on private lands, the Contractor shall obtain a statement from the land owner that the land owner has been apprised by the Contractor of the erosion control requirements and accepts complete responsibility for their implementation.

1.3. REFERENCES

- 1.3.1. New York Standards and Specifications for Erosion and Sediment Control.

** END OF SECTION **

SECTION 01570
MAINTENANCE AND PROTECTION OF TRAFFIC

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for the furnishing, installing, maintaining and removing, when no longer required, of all traffic control devices necessary for the maintenance and protection of pedestrian and vehicular traffic.

1.2. SYSTEM DESCRIPTION

- 1.2.1. The Contractor shall keep the portion of the project being used by public traffic, whether it be through or local traffic, in such condition that pedestrian and vehicular traffic will be adequately and safely accommodated, both temporarily and permanently. The Contractor shall erect, and/or maintain in good condition, striping, barricades, signs, lights, traffic signals, cones, and other warning and danger signals and devices, including flagmen and uniformed traffic directors, appropriate and adequate for the specific needs and as specified in the NYSDOT Manual of Uniform Traffic Control. Traffic control devices are to be provided at work sites, closed roads, intersections, open excavations, locations of material storage, standing equipment and other obstructions, at points where usable traffic width of road is reduced, at points where traffic is diverted from its normal course or lanes, and other places of danger to vehicular or pedestrian traffic.
- 1.2.2. The requirements of the agency having jurisdiction over the roadways in which the contractor is working shall govern. If the governing jurisdiction does not feel that the contractor is meeting the required traffic control as set forth in the New York State Department of Transportation manual, all work shall be stopped until the contractor complies. This shall not entitle the contractor to a time extension or claim for delays.
- 1.2.3. The contractor shall provide access for police, fire, ambulance, bus and emergency vehicles and personnel at all times on all roads in which the Contractor is working.
- 1.2.4. The Contractor may be required to provide, in addition to flagmen, uniformed traffic officers to fulfill the expressed needs of the municipality or any governmental agency having jurisdiction.

- 1.2.5. If the Contractor reroutes traffic over detours, he shall first obtain authorization of the Engineer and consent of the appropriate authorities having jurisdiction. The Contractor shall make all necessary arrangements with such authorities regarding the establishment, maintenance and repair of such detours, the regulation and direction of traffic thereon, and signing. Adequate directional and detour signs, acceptable to the appropriate authorities, shall be furnished by the Contractor and shall be erected by him at locations where such authorities may direct.
- 1.2.6. When the construction of a detour is provided for in the drawings or requested by the jurisdictional authority, the Contractor shall furnish and erect all necessary signs, barricades, lights and other warning and danger signals and devices.
- 1.2.7. During any suspension of the work, the Contractor shall make passable, and shall open to traffic such portions of the project and temporary roadways or portions thereof, as may be agreed upon between the Contractor, the Engineer and the jurisdictional authority for the temporary accommodation of necessary traffic during the anticipated period of suspension. When work is resumed, the Contractor shall replace or renew all work or materials lost or damaged because of such temporary use of the project and shall complete the project in every respect as though its prosecution had been continuous and without interference.
- 1.2.8. Prior to beginning construction work in any area or phase of the project, the Contractor shall erect or place those barricades, lights, signs, cones and other warning and danger signals and devices which are adequate and appropriate for that particular area or phase. Traffic control devices shall conform to the drawings and specifications and to the Manual of Uniform Traffic Control Devices of the Federal Highway Administration and NYSDOT.
- 1.2.9. All signs shall be erected and maintained in a substantial manner and shall be maintained so as to provide maximum visibility and legibility at all times.

1.3. REFERENCES

- 1.3.1. NYS DOT Standard Specifications.
- 1.3.2. NYS DOT Manual of Uniform Traffic Control Devices.
- 1.3.3. Manual on "*Uniform Traffic Control Devices for Streets and Highways*," U. S. Department of Transportation, Federal Highway Administration.

1.4. SUBMITTALS

- 1.4.1. The Contractor shall notify the owners of adjoining property in writing at least 24 hours prior to the time he proposes to begin any work which will interfere with their normal passage.

- 1.4.2. The Contractor shall notify the Engineer and the jurisdictional authority ten working days in advance of a tentative date for establishing new traffic patterns. This date shall be finalized five working days prior to the establishment of new traffic patterns resulting from staged construction and five working days prior to the establishment of a detour for the closing of any roadway.
- 1.4.3. Review by the Engineer of the Contractor's traffic control system shall in no way relieve the Contractor from his full responsibility for the maintenance and protection of traffic.
- 1.4.4. Shop Drawings shall be submitted by the Contractor in accordance with the provisions of the Section "Shop Drawings and Samples," Division 1.

1.5. PROJECT CONDITIONS

- 1.5.1. Except as necessary during actual working hours, and then only with the specific authorization of the Engineer or jurisdictional authority, the Contractor shall not occupy with his equipment, materials, or personnel, any roadway or sidewalk area within or adjacent to the project that is open to traffic.
- 1.5.2. No equipment or machinery having caterpillar or other heavy treads that mar or damage pavements shall be permitted to move over or operate from newly constructed or existing pavements unless such equipment or machinery is moved on suitable pontoons or trailers or operated on heavy planing or other suitable platforms.
- 1.5.3. The Contractor shall provide for prompt removal from existing roadways of all dirt and other materials that have been spilled, washed, tracked or otherwise deposited thereon by his hauling and other operations whenever the accumulation is sufficient to cause the formation of mud, interfere with drainage, damage pavements, create a traffic hazard or dust condition.
- 1.5.4. The Contractor shall cease work on existing roads when snow is imminent. The Contractor is responsible for snow removal on any roads on which he is working. He shall, however, park his equipment in such a manner as not to hinder the removal of snow by other agencies. The Contractor shall make suitable provisions to mark the location of equipment and all other obstructions in the event of deep snow.

PART 2 PRODUCTS

2.1. MATERIALS

- 2.1.1. **Barricade, Type IIIA:** Materials and construction shall be as specified in the Manual of Uniform Traffic Control Devices. Lighting shall be placed and maintained as required.

- 2.1.2. **Drums:** Materials shall be as specified in the Manual of Uniform Traffic Control Devices. Each drum when used to delineate the edge of a traveled way on detour curves, lane changes, lane closures and other similar conditions shall be lighted with a steady burning light as hereinafter specified. All drums used at other locations shall be lighted with a low intensity flashing warning light. Drums shall be clean, bright and reflectorized.
- 2.1.3. **Traffic Cones:** Material and construction shall be as specified in the Manual of Uniform Traffic Control Devices. Cones shall be kept clean and bright for maximum target value. Traffic cones shall be reflectorized or equipped with steady burning lights when used during the hours specified below for steady burning lights. Cones shall be painted orange. Rubber cones shall be painted at the place of manufacture. Plastic cones shall be polyvinyl chloride with the color molded into the plastic.
- 2.1.4. **Barricade, Type I:** Material and construction shall be as specified in the Manual of Uniform Traffic Control Devices. Barricade, Type I shall be lighted with low intensity flashing warning lights.
- 2.1.5. **Breakaway Barricades:** Materials and construction shall be as specified in the Manual of Uniform Traffic Control Devices. Breakaway Barricades shall be lighted with low intensity flashing warning lights.

2.2. LIGHTING SPECIFICATIONS

- 2.2.1. **General:** Storage batteries or other bulk power sources, not part of a monolithic flasher unit shall be located as far as practical from the traveled way and at ground level. Single flasher and steady burning units with self-contained batteries shall weigh not more than seven pounds and when located on traffic control devices shall be securely fastened with the bottom tangent of the lens at 36" above the existing ground level. Battery powered dual alternate flashers located on advance warning signs shall have the battery power source located as far as practical from the traveled way and at ground level.
- 2.2.2. **Steady burning lights:** Steady burning lights shall be installed on traffic control devices where specified elsewhere herein. Steady burning lights shall be low wattage yellow electric lamps having a minimum of ten beam candle power. They may be self-contained units with a batteries or may be operated with a portable electric generator or from available utility lines. When a circuit in excess of fifty volts is used and such circuits including the light units are within reach of a person who can make contact with the ground, they shall be equipped with a UL approved ground-fault circuit interrupter. Steady burning lights when used where specified shall be kept lighted from one hour before sunset until one hour after sunrise, and through all hours of fog, smog, and other adverse atmosphere conditions affording insufficient visibility for the safe operation or traffic.

- 2.2.3. **Low Intensity Flashing Warning Lights:** Low intensity flashing warning lights shall be installed on traffic control devices where specified elsewhere herein. Low intensity lights shall be battery operated yellow flashing lights with a one piece lens not less than seven inches in diameter. They shall flash at a rate of 55-75 flashes per minute and the flash duration shall be ten percent of each flash cycle. Light intensity shall not drop below ten candelas during the first 336 hours of continuous flashing as specified in ITE Standards Requirement 5.0, Paragraph 5.10, Section 1 of the ITE Standards for Flashing and Steady Burn Barricade Warning Lights. The lens shall be externally illuminated by reflex elements built into the lens to be seen by reflex-reflection of the light from the headlights of oncoming automotive traffic. Intensity when acting as a reflex-reflector shall be as in ITE Standard Requirement 5, Paragraph 5.50. If designed with a reflex reflector ring, the ring shall not be less than 1/2" in width around the periphery of the lens. Manufacturing design requirements shall conform to the ITE Standard. Low intensity flashing warning lights when used where specified shall be kept lighted as specified for steady burning lights.

2.3. CONSTRUCTION SIGNS

- 2.3.1. The type, size, legend, color, illumination, location, number and shape of construction signs shall be in accordance with the MUTCD.
- 2.3.2. The number and construction of sign supports shall be as shown on the drawings unless otherwise directed by the jurisdictional authority.

2.4. PAVEMENT MARKINGS

- 2.4.1. Pavement markings shall be ready-mixed white or yellow traffic paints, fast dry, with glass beads applied for nighttime visibility with the composition as described in the NYS DOT Standard Specifications.

PART 3 EXECUTION

3.1. ERECTION

- 3.1.1. As a minimum the Contractor shall erect, maintain and replace as necessary, the required signs for each direction of traffic on all private, municipal, county or state roadways affected by the project. The signs shall bear no symbols or messages except as specified. The sign supports shall carry no other signs not essential to traffic control.

3.2. INSTALLATION

- 3.2.1. **Barricade, Type IIIA:** When a road section is closed to traffic, Type IIIA Barricades shall be erected at points of closure. They may extend completely across a roadway and its shoulder or from curb-to-curb. Where provisions must be made for access of equipment and authorized vehicles, the Type IIIA barricades should be provided with gates or movable sections that can be closed when work is not in progress, or with indirect openings that will discourage public entry. Where access is provided through the Type IIIA barricades, responsibility shall be assigned to a person to assure proper closure at the end of each working day. When a road is legally closed, but access must still be allowed for local traffic, the Type IIIA barricade cannot be erected completely across a roadway. Instead, an arrangement should be devised that will permit local use but effectively discourage use by through traffic. The use of Type IIIA barricade in areas where contact with public vehicular traffic is possible must be approved by the Engineer and/or the jurisdictional authority.
- 3.2.2. **Drums:** Drums shall generally be used to delineate the edge of a traveled way on detour curves, lane changes, lane closures and other similar conditions such as to channel traffic. Drums may also be used to mark specific hazards.
- 3.2.3. **Traffic Cones:** Traffic cones shall generally be installed to channel traffic.
- 3.2.4. **Barricade, Type I:** Type I barricades are intended for use in situations where traffic is maintained through the area being constructed and/or reconstructed. They may be used singly or in groups to mark a specific hazard or they may be used in a series for channeling traffic. Type I barricades would normally be used on conventional roads or urban streets and arterials.
- 3.2.5. **Breakaway Barricades:** Breakaway barricades shall be used as a warning and a delineation device at the edge of the traveled way.
- 3.2.6. **Pavement Markings:** Pavement markings, both permanent and temporary, shall be constructed in accordance with the MUTCD. Where maintenance of traffic or construction staging require the use of traffic stripes for relatively short and temporary periods, striping of pavements and base courses shall be accomplished before opening to traffic. Where traffic stripes are to be provided on the final surface of the pavement, the stripes shall be placed before the pavement is opened to traffic. The contractor shall maintain the traffic stripes in good condition at all times. When no longer required, all temporary traffic stripes shall be removed from the pavement by use of appropriate brush and detergents or by other means approved by the jurisdictional authority.

3.2.7 Uniformed Traffic Directors: Uniformed traffic directors shall be provided when and where called for in the specifications or as directed by the jurisdictional authority and authorized by the Engineer. The Contractor shall, with the permission of the respective Police Department, secure the services of uniformed police officers to direct traffic in those parts of the project under the jurisdiction of the respective municipality. These directors shall be responsible and trained in their duties to direct pedestrian and vehicular traffic, shall act in conformance with Police Department requirements and while serving as traffic directors on this project, shall not be required to perform any other duties. When controlling traffic, uniformed traffic directors shall follow the procedures stipulated for flagmen in the MUTCD.

3.2.8. Flagmen: Flagmen provided by the Contractor who are normally hired to do other work on the project during the same work period, shall not be considered as uniformed traffic directors. Flagmen shall be provided when and where called for in the specifications or as directed by the jurisdictional authority and authorized by the Engineer. Flagmen shall be trained and of average intelligence, good physical condition, including sight and hearing, having a mental alertness, a courteous but firm manner, neat appearance and sense of responsibility for the safety of the public. Flagmen shall wear an orange vest. This garment shall be reflectorized for nighttime operations.

**** END OF SECTION ****

SECTION 01600

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Products and Materials
 - 2. Product Delivery Requirements
 - 3. Packaging, Handling and Storage Requirements
 - 4. Inspection of Offsite Work

1.2 QUALITY ASSURANCE

- A. Review all contract Drawings and Specifications with respect to specific system characteristics, applicability of materials and equipment for the intended purposes, sizes, orientation, and interface with other systems, both existing and proposed, and certify that the materials and equipment proposed will perform as specified prior to submitting shop drawings.
- B. Provide sworn certificates as to quality and quantity of materials where specified or requested by the Engineer.
- C. Obtain concurrence of the Engineer prior to processing, fabricating, or delivering material or equipment.

1.3 PRODUCTS AND MATERIALS

- A. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by a single manufacturer unless specified otherwise.
- B. Use only new and first quality material in the Work. Material shall conform to the requirements of these Specifications and be approved by the Engineer. If, after trial, it is found that sources of supply that have been approved do not furnish a uniform product, or if the product from any source proves unacceptable at any time, the Contractor shall furnish approved materials from other approved sources.
- C. Immediately remove defective materials and equipment from the site, at no additional cost to the Owner. The Contractor may be required to furnish sworn certificates as to the quality and quantity of materials before materials are incorporated in the Work.
- D. Engineer has the right to approve the source of supply of all material prior to delivery.

1.4 PRODUCT DELIVERY REQUIREMENTS

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

- D. Progressively deliver materials and equipment to the Site so there will be neither delay in progress of the Work nor an accumulation of material that is not to be used within a reasonable time.
- E. Deliver products to the Site in their manufacturer's original container, with labels intact and legible.
 - 1. Maintain packaged materials with seals unbroken and labels intact until time of use.
 - 2. The Engineer may reject as non-complying such material and products that do not bear identification satisfactory to the Engineer as to the manufacturer, grade, quality, source, and other pertinent information.

1.5 PACKAGING, HANDLING AND STORAGE REQUIREMENTS

- A. Provide storage and handling of all materials and equipment required for the Work.
- B. Except as otherwise indicated in the Contract Documents, determine and comply with the manufacturer's recommendations on product storage, handling, and protection. Provide manufacturer's documentation on recommended storage procedures when requested by the Engineer.
- C. Properly store and protect all equipment immediately upon its arrival. All equipment shall be stored in a clean, dry, heated, secured, and insured indoor facility satisfactory to the Engineer. Equip drive motors with thermostatically controlled strip heaters. Outdoor storage with plastic, canvas, plywood or other cover will not be allowed except where specific approval for designated items not containing electrical components or bearings is obtained from the Engineer. This approval does not relieve the Contractor of responsibility for proper protection of materials.
- D. Familiarize workmen and subcontractors with hazards associated with materials, equipment, and chemicals specified herein and take all necessary safety precautions.
- E. Areas available on the construction site for storage of material and equipment shall be as shown on the Drawings or approved by the Owner.
- F. Materials and equipment to be incorporated in the Work shall be handled and stored by the manufacturer, fabricator, supplier, and Contractor before, during and after shipment in a manner to prevent warping, twisting, bending, breaking, chipping, rusting, and any injury, theft, or damage of any kind to the material or equipment.
- G. Promptly remove materials from the site of the Work which have become damaged or are unfit for the use intended or specified. The Contractor will not be compensated for the damaged materials or their removal costs.
- H. Handle, haul, and distribute all materials and all surplus materials on the different portions of the Work, as necessary or required. Provide suitable and adequate storage room for materials and equipment during the progress of the Work, and be responsible for the protection, loss of, or damage to materials and equipment furnished, until the final completion and acceptance of the Work.
- I. Storage and demurrage charges by transportation companies and vendors shall be borne by the Contractor.

- J. All materials and equipment to be incorporated in the Work shall be placed so as to not damage 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. Keep materials and equipment neatly piled and compactly stored in such locations as will cause a minimum of inconvenience to the Owner.
 - K. No material or equipment will be permitted to be stored in any of the Owner's facilities, unless otherwise approved by the Engineer.
 - L. Do not store material or equipment in any wetland or environmentally sensitive area. Stockpile sites shall be level, devoid of mature stands of natural vegetation, and removed from drainage facilities and features, wetlands, and stream corridors.
 - M. Contractor shall be fully responsible for loss or damage to stored materials and equipment.
- PART 2 PRODUCTS – NOT USED
- PART 3 EXECUTION – NOT USED

END OF SECTION

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SECTION 01620
PRODUCT DELIVERY, STORAGE AND HANDLING

PART 1 GENERAL

1.1. SECTION INCLUDES

1.1.1. Requirements for properly delivering, storing and handling products.

1.2. SYSTEM DESCRIPTION

1.2.1. Products shall be delivered, stored and handled in a manner that will assure preservation of quality and fitness for incorporation in the work.

1.2.2. As and if required products shall be protected from the elements during storage by providing sheltered, weather-tight enclosures. Skids or platforms shall be provided for products subject to damage by contact with ground.

1.2.3. Packaged materials shall be stored in their original packages or containers with weather resistant tags identifying the package contents, manufacturer's name and Contractor's name.

1.2.4. **Copies of all delivery tickets, vendor tickets, bills of lading and other records shall be given to the Engineer or construction observer at the time of delivery and shall contain the name of supplier, material delivered, quantity of material, date of delivery and project name.**

1.2.5. If partial payments have been made for products or equipment suitably stored off-site, the Contractor shall provide certificates of insurance for full replacement value of the products or equipment.

1.2.5.1. Unless otherwise specified, the Contractor shall provide insurance to hold harmless the Owner and Engineer against liability claims and judgements or demands for damages arising from accidents to persons or property occasioned by transportation, handling and storage of products or equipment. A certificate shall be provided prior to shipping.

1.2.6. The Contractor shall comply with manufacturer's recommendations concerning periodic maintenance requirements for items stored for extended periods.

1.2.7. **Equipment or materials shall not be stored on the site in such a manner as to interfere with the Owner's operation, create obstructions that would endanger the public, or interfere with the work. Equipment and material shall not be stored within 100 feet of any intersection, or on any sidewalks.**

- 1.2.8. Pipe, manholes, appurtenances, backfill material, stone, select materials, and all other construction materials shall not be stored or stockpiled on public thoroughfares or adjoining rights-of-way more than one day in advance of their intended incorporation into the work. In no case shall any material be stored or stockpiled outside of the rights-of-way or easements or on private property without the written permission of the property owner. A copy of said written permission shall be supplied to the City of Beacon.

**** END OF SECTION ****

SECTION 01651
CONNECTION TO EXISTING UTILITIES

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for connecting to existing utility systems.

1.2. SYSTEM DESCRIPTION

- 1.2.1. The Owner, Engineer and Utility Owner shall be notified 48 hours in advance of all tie-ins to existing utility systems.
- 1.2.2. All new utility services requiring connection to existing utility systems shall remain isolated from the existing utility until all required tests have been satisfactorily complied with and if required, the service has been inspected and approved by the respective utility owner.
- 1.2.3. All materials and construction methods used for the connection to an existing utility and the requirements for protecting the same shall comply with the respective utility company's requirements.

1.3. SUBMITTALS

- 1.3.1. Prior to construction, the proposed method of connection and list of materials to be used for the necessary utility connections shall be submitted in accordance with the requirements of Division 1.

** END OF SECTION **

SECTION 01770

CLOSEOUT PROCEDURES

1.1 SUMMARY

A. Section Includes

1. Documentation required for the transfer of the completed Work to the Owner
2. Final Cleaning

1.2 SUBMITTALS

A. Closeout Submittals

1. As-built drawings
2. Operation and maintenance manuals
3. Evidence of payment and release of liens
4. List of Subcontractors, service organizations, and principal vendors

1.3 SUBSTANTIAL COMPLETION

- A. Refer to 00700, General Conditions, for procedures relating to obtaining Substantial Completion. Refer to Agreement for Contract times.

1.4 PROJECT CLOSEOUT DOCUMENTS

- A. As-built Drawings - Submit as-built drawings review, approval, or comment. The as-built drawings shall show the completed work, including all deviations from the Drawings. The as-built drawings shall depict the location of all conduit and devices exterior from the motor control centers, the location of valves, small diameter piping, relocated devices and all field changes.
1. Take swing ties to all underground work from a minimum of two horizontal locations. Vertical dimensions to all below grade work shall also be obtained. Show all fittings, bends, valves and other appurtenances. At a minimum, the following information should be shown on the as-built drawings for exterior construction:
 - a. Ties to all buried fittings (including tees, crosses, bends, reducers, wyes, offsets, adapters, sleeves, caps, plugs), valves, services and structures from two horizontal measurements to permanent surface reference points, and depth below permanent grade. Permanent surface reference points are manholes, catch basins, power poles, and above-grade structures.
 - b. Ties to all surface structures (including manholes, catch basins, vaults, valve boxes, hydrants, curb stops, cleanouts, wet wells, outlets, etc.) from two horizontal measurements to permanent surface reference points.

- c. Ties to other utility crossings and abandoned pipelines from two horizontal measurements to permanent surface reference points. Include depth below permanent grade and spacing between crossing utilities.
 - d. Invert and rim elevation of all gravity pipelines and structures including manholes, catch basins, below-grade structures, wet wells, septic tanks and distribution boxes as appropriate.
 - e. Change to pipe size and materials.
 - 2. Locate all utilities and appurtenances concealed in construction. Provide detail not shown on Contract Documents. Use colored pencils or felt tipped pens to record all revisions to the as-built drawings. Use the following color code unless otherwise approved by the Engineer:
 - a. Process and Mechanical: Red
 - b. Architectural: Blue
 - c. Structural: Purple
 - d. Plumbing: Brown
 - e. HVAC: Green
 - f. Electrical: Orange
 - g. Other: Black
- B. Operation and Maintenance manuals – Submit four copies of Operation and Maintenance Manuals for items listed in other sections of these Specifications and for other items when directed by the Engineer.
- 1. Manuals shall be in three-ring binders. However, manuals which consist of 20 or fewer pages may be bound using three-hole, plastic, clear-front report covers.
 - 2. Manuals shall include, as a minimum:
 - a. The Operations and Maintenance Manual Certification Form (copy attached at the end of this Section) which shall be attached to every copy of each Operations and Maintenance Manual submitted.
 - b. A comprehensive index broken down into sections and sub-sections
 - c. A complete list of the equipment supplied, including serial numbers, ranges, and pertinent data
 - d. Full specifications on each item
 - e. Detailed service, maintenance and operation instructions for each item supplied
 - f. System schematic drawings “as Constructed,” illustrating all components, piping and electrical connections of the systems supplied under Division 16

- g. Clearly defined special maintenance requirements particular to this system, along with special calibration and test procedures
- h. Operating instructions with a functional description of the entire system, with references to the systems schematic drawings and instructions
- i. Complete parts lists with stock numbers and name, address, and telephone number of the local supplier
- j. A complete "As Constructed" set of approved shop drawings
- k. The format of the O&M manual shall meet the following general requirements:
 - 1) Complete, comprehensive index
 - 2) Section with operating instructions including complete overview of the system
 - 3) Section with a complete parts list as described above
 - 4) Section that includes all schematic diagrams, wiring diagrams etc. of the "As Constructed System"
 - 5) Product information
- l. Section and sub-section dividers
- m. Separate divider for each product
- n. Data sheets indicating the tag names (as used on the Drawings), manufacturer, complete model number, complete specifications, and parameter setup sheet with the parameter setup sheets following the manufacturers O&M manual in its entirety
- o. Final documentation written specifically for this project including standard and modified standard documentation, with modifications to existing hardware or software manuals made on the respective pages or inserted adjacent to the modified pages. All standard documentation furnished shall have all portions that apply clearly indicated, and all portions that do not apply shall be lined out.
- p. All illustrations, detailed drawings, wiring diagrams, and instructions necessary for installing, operating, and maintaining the equipment, with illustrated parts numbered for identification and all information applying specifically to the equipment furnished and only including instructions that are applicable. All such illustrations shall be incorporated within the printing of the page to form a durable and permanent reference book.

C. Final Documentation – Submit the following final documentation:

- 1. As-Built documentation shall include all previous submittals, as described in this Specification, updated to reflect the as-built system.
- 2. The maintenance documentation shall describe the detailed preventative and corrective procedures required to keep the system in good operating condition. All hardware maintenance manuals shall make reference to appropriate

diagnostics, where applicable, and all necessary timing diagrams shall be included. A maintenance manual or a set of manuals shall be furnished for all delivered hardware, including peripherals. The hardware maintenance documentation shall include, as a minimum, the following information:

- a. Operation information – This information shall include a detailed description of how the equipment operates and a block diagram illustrating each major assembly in the equipment.
 - b. Preventative-maintenance instructions – These instructions shall include all applicable visual examinations, hardware testing and diagnostics routines, and the adjustments necessary for periodic preventative maintenance of the system.
 - c. Corrective-maintenance instructions – These instructions shall include guides for locating malfunctions down to the card-replacement level. These guides shall include adequate details for quickly and efficiently locating the cause of an equipment malfunction and shall state the probable source(s) of trouble, the symptoms, probable cause, and instructions for remedying the malfunction.
 - d. Parts information – This information shall include the identification of each replaceable or field-repairable module. All parts shall be identified on a list in a drawing; the identification shall be of a level of detail sufficient for procuring any repairable or replaceable part. Cross-references between the Contractor's part number and manufacturer's part numbers shall be provided. All PC boards shall be identified by; manufacturer and model number, slot number, part name and configuration (if applicable).
- D. Provide warranties and bonds for items so listed in pertinent other sections of the Project Manual. Provide all warranties and bonds in a three-ring binder.
- E. Provide keys and keying schedule, where applicable.
- F. Provide evidence of compliance with requirements of governmental agencies having jurisdiction including:
1. Certificates of Inspection.
 2. Certificates of Occupancy.
- G. As specified in Section 00700, provide evidence that all Work, materials and equipment will pass to Owner free and clear of any Liens or other title defects upon final payment. Such evidence may take the form of receipts or releases from all Subcontractors and Suppliers and an affidavit from Contractor as to the completeness of the receipts and releases.
- H. List of Subcontractors, service organizations, and principal vendors, including names, addresses, and telephone numbers where they can be reached for emergency service at all times including nights, weekends, and holidays.
- I. Equipment start-up reports shall be submitted in duplicate to the Engineer for each piece of equipment installed. The report shall include detailed descriptions of the points inspected, tests, and adjustments made, quantitative results obtained and

maintenance suggestions. The report shall certify that the equipment (1) has been satisfactorily installed and conforms to the Contract requirements; (2) is in accurate alignment and free from undue stress; (3) has been operated under full load and operates satisfactorily; and (4) nothing in the installation will render the manufacturer's warranty null and void. Equipment start-up reports shall be included in the appropriate equipment O&M manuals.

- J. Provide records of all Owner training/instruction sessions conducted in accordance with paragraph 1.5 of this Section and as required in the project Specifications. The record for each training session shall include reference to the relevant specification section, a summary of the topics covered in the training session, and a sign-in sheet listing all attendees in attendance for the training.
- K. Provide color charts, legends, instructions, special tools and other requirements specifically requested in sections of the Specification.

1.5 INSTRUCTION OF OWNER'S PERSONNEL

- A. Provide instruction by qualified manufacturers' representatives in the proper operation, maintenance, adjustment and the safety aspects of the equipment and materials furnished. Specific instruction requirements may be included within the sections of the Specification.

1.6 FINAL CLEANING & REPAIRS

- A. Complete cleaning prior to final inspection. Cleaning shall include all interior and exterior glass and surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces. Thoroughly wipe clean all ductwork, piping, equipment, devices, and exposed surfaces. Clean debris from lawns, roofs, downspouts and gutters. Sweep paved surfaces and rake lawns and landscaped areas.
- B. Use only cleaning materials that will not create hazards to health or property.
- C. Remove and entirely dispose of material or debris that has washed, flowed or has been placed in existing watercourses, ditches, gutters, drains, pipe, or structures, for work done under the Contract work limits. Leave ditches, channels, drains, pipes, structures, and watercourses in a clean and neat condition upon completion of the Work.
- D. On or before the completion of the Work, tear down and remove all temporary buildings and structures, remove all temporary works, tools, and machinery or other construction equipment, remove all rubbish from any grounds which has been occupied and leave the roads and all parts of the premises and adjacent property in a neat and satisfactory condition.
- E. Restore or replace any public or private property damaged or removed during the course of the Work. Property shall be returned to a condition at least equal to that existing immediately prior to the beginning of operations. Complete all highway or driveway, walk, and landscaping work using suitable materials, equipment and methods. Perform restoration of existing property, signs or structures promptly as work progresses; do not leave restoration work until the end of the Contract Time.

1.7 COMPLETION

A. The Contract shall be considered complete and final payment made, only when:

1. All provisions of the Contract Documents have been strictly adhered to.
2. All damage to adjoining areas caused by the Work has been repaired.
3. The project and premises have been left in good order, including removal of all temporary construction, Contractor-owned and extraneous materials as required.
4. All warranties, Operation and Maintenance Manuals, maintenance instructions, releases, and permits called for in the Contract have been submitted to the Owner and Engineer as applicable.
5. All as-built drawings as required by the Contract Documents have been submitted to the Owner.
6. All monies owed the Owner for services performed for the Contractor by Owner's forces in connection with the Contract have been paid.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

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O&M MANUAL CERTIFICATION FORM

PROJECT: _____
ENGINEER: _____ ENGINEER'S PROJECT NO.: _____
CONTRACTOR: _____ CONTRACTOR'S PROJECT
NO.: _____

TRANSMITTAL NO.: _____ SHOP DRAWING NO.: _____
SPECIFICATION NO.: _____ DRAWING NO.: _____
DESCRIPTION: _____
MANUFACTURER: _____

The above referenced O&M manual has been reviewed by the undersigned and I/we certify that the manual is customized as needed for this project, and contains the following items, where applicable for the materials or equipment provided:

- | | |
|--|---|
| <input type="checkbox"/> 3-ring binder with title on binder and binding edge | <input type="checkbox"/> Complete parts list of equipment supplied |
| <input type="checkbox"/> Electronic CD, when specified | <input type="checkbox"/> Complete specifications/data on each item |
| <input type="checkbox"/> Comprehensive index broken down into sections | <input type="checkbox"/> Detailed maintenance & operations instructions |
| <input type="checkbox"/> Dividers for sections and sub-sections | <input type="checkbox"/> "As constructed" layout & schematic drawings |
| <input type="checkbox"/> Warranties | <input type="checkbox"/> Wiring diagrams |
| <input type="checkbox"/> Troubleshooting information | <input type="checkbox"/> Lubrication & maintenance schedules |
| <input type="checkbox"/> Startup, operation & shutdown procedures | <input type="checkbox"/> Equipment performance curves |
| <input type="checkbox"/> Safety procedures | <input type="checkbox"/> List of spare parts supplied and current cost |
| <input type="checkbox"/> Manufacturer's contact information | <input type="checkbox"/> Parts & service contact information |

SUBMITTED BY: _____ DATE: _____

GENERAL CONTRACTOR'S STAMP

SECTION 02015
TEST PITS - VERIFICATION OF UTILITIES & STRUCTURES

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for the verifying in the field the location of existing utility locations and structures.

1.2. SYSTEM DESCRIPTION

- 1.2.1. **The Contractor shall accurately locate all utilities and structures in the field sufficiently in advance of the work to enable a field evaluation of the proposed work, but in no case less than seven days prior to the excavation for the proposed work. Test pits shall be dug at all proposed utility crossings for the new watermain lines.**
- 1.2.2. Where a test pit must be dug to obtain information relative to fabricating materials to fit field conditions, the pit shall be scheduled and dug such that the fabrication process may proceed and not impede construction progress.
- 1.2.3. Requirements for the test pit excavation prior to actual construction in the test pit area may require special dewatering methods or equipment to be used since the normal dewatering system for construction of the work will not be operable.
- 1.2.4. The Contractor shall coordinate the digging of all test pits with the respective utility owners having facilities in the vicinity of the location of the test pit.
- 1.2.5. Test pits shall be excavated by the Contractor at those locations where he requests and receives authorization of the Engineer.
- 1.2.6. Failure of the Engineer to authorize digging of test pits will not relieve the Contractor from his contractual obligations regarding location, protection and preservation of utilities and structures.
- 1.2.7. **All dimensions, locations, elevations, and other information about the exposed utilities, facilities, lines and structures shall be accurately recorded by the Contractor and submitted to the Engineer.**
- 1.2.8. In addition to recording all pertinent information, the Contractor shall take sufficient color photographs to clearly show the configuration, location and condition of the exposed facilities. These photographs shall also be submitted to the engineer.

1.3. SUBMITTALS

- 1.3.1. Contractor shall submit with the Contractor's construction schedule the proposed locations and schedule of test pits to the Engineer for review and shall not proceed with the excavation without authorization from the Engineer.

PART 3 EXECUTION

3.1. EXCAVATION

- 3.1.1. Excavation of test pits shall be accomplished by such means as are required including hand excavation in the anticipated vicinity of the utilities and structures, to ensure that the underground utilities or structures that may be encountered are not damaged. It shall be the Contractor's sole responsibility for any damages incurred during the excavation operations. All such damages shall be repaired or replaced by him (if permitted) to the satisfaction of the Owner, responsible utility and/or Engineer at the Contractor's own expense. Where the repair or replacement must be done by the Owner/responsible utility any and all costs thereof shall be borne by the Contractor.
- 3.1.2. Contractor shall provide and maintain the test pit site in a safe condition.

**** END OF SECTION ****

SECTION 02075**GEOSYNTHETICS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes
 - 1. Non-woven geotextiles

1.2 REFERENCES

- A. Data Sheet DS1 - Non-Woven Geotextiles
- B. ASTM D1248 - Specification for Polyethylene Plastics Molding and Extrusion Materials
- C. ASTM D1388 - Test Methods for Stiffness of Fabrics
- D. ASTM D3786 - Test Method for Hydraulic Bursting Strength of Knitted Goods and Non-woven Fabrics: Diaphragm Bursting Strength Tester Method
- E. ASTM D4218 - Test Method for Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique
- F. ASTM D4491 - Test Methods for Water Permeability of Geotextiles by Permittivity
- G. ASTM D4533 - Test Method for Trapezoid Tearing Strength of Geotextiles
- H. ASTM D4632 - Test Method for Grab Breaking Load and Elongation of Geotextiles
- I. ASTM D4751 - Test Method for Determining the Apparent Opening Size of a Geotextile
- J. ASTM D4833 - Test Method for Index Puncture Resistance of Geotextiles Geomembranes and Related Products
- K. ASTM D5261 - Test Method for Measuring Mass per Unit Area of Geotextiles
- L. ASTM D5262 - Standard Test Method for Evaluating the Unconfined Tension Creep Behavior of Geosynthetics

1.3 SUBMITTALS

- A. Product samples and data for all geosynthetics proposed for use on this project.
- B. Manufacturer-approved construction quality assurance/quality control manual for all of the geosynthetics proposed for use on this project.
- C. Manufacturing quality control testing data specified. Submit certification of required performance testing on all geosynthetics by an independent laboratory and label and identify all geosynthetic products delivered to the site.
- D. Manufacturer's recommended installation and fastening details for the erosion control blankets and turf reinforcement matrices. The following details are required:

1. Typical stapling pattern and spacing. List staple density in terms of staples per square yard.
 2. Anchoring details for channels and slopes.
 3. Transverse blanket lap splice details, as well as longitudinal lap splice details if parallel blankets are to be installed.
 4. Termination details for the origin and termination of the channels and slopes.
- E. Manufacturer's recommended installation details including, orientation, overlap, and joining/seaming information for all drainage geocomposite products.

1.4 QUALITY ASSURANCE

- A. Obtain from the geosynthetic product manufacturers a warranty that their products are free from defects in materials and workmanship at the time of delivery to the project site.
- B. Material found to be defective or which does not conform to these specifications will be rejected.

1.5 DELIVERY, STORAGE AND PROTECTION

- A. The Engineer reserves the right to reject and require replacement of any damaged materials delivered to the site, at no additional cost to the Owner.
- B. Stockpile and store the materials in accordance with the manufacturer's recommendations.
- C. Label and bag all geosynthetic rolls in packing that is resistant to photo degradation by ultraviolet (UV) radiation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Group 1 Non-Woven Geotextile
 1. "C-46NW" as manufactured by Contech Construction Products, Inc.
 2. "FX-40HS" as manufactured by Carthage Mills
 3. "140NC" as manufactured by Mirafi Inc.
 4. Or equal

2.2 MATERIALS

- A. Non-woven geotextiles shall be manufactured from a continuous polypropylene filament. A needle punching process shall achieve bonding.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Inspect all products prior to the installation for any defects that may have been the result of storage and handling. The Engineer reserves the right to reject and require replacement of any damaged product, at no additional cost to the Owner.

3.2 INSTALLATION

- A. Install geosynthetic products in accordance with the approved manufacturer's QA/QC manuals, project details, and pertinent sections of these Specifications.

3.3 QUALITY CONTROL

- A. The Engineer may remove a sample (i.e. a strip that is 3 feet long by the entire roll width) from a maximum of 1 roll of each 10 rolls of all geosynthetic materials delivered to the project, and submit the samples to an independent laboratory for analysis of the product to ensure that the geosynthetics meet the specifications herein.

END OF SECTION

(DATA SHEETS FOLLOW)

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Data Sheet DS1 - Non-Woven Geotextile Mechanical Properties								
Property	Test Method	Units	Testing Frequency	Value				
				Group 1	Group 2	Group 3	Group 4	Group 5
Mass per Unit Area	ASTM D5261	oz/yd²	1/150,000 ft²	4	6	8	12	16
AOS	ASTM D4751	US Sieve	1/150,000 ft²	70	70	100	100	100
Permittivity	ASTM D4491	gal/min/ft²	1/150,000 ft²	140	90	80	70	50
Puncture Strength	ASTM D4833	lbs	1/150,000 ft²	60	90	130	195	245
Mullen Burst Strength	ASTM D3786	lbs/in²	1/150,000 ft²	225	350	400	650	800
Trapezoidal Tear Strength	ASTM D4533	lbs	1/150,000 ft²	35	65	80	115	145
Grab Tensile/Elongation	ASTM D4632	lbs(%)	1/150,000 ft²	95 (50)	150 (50)	200 (50)	300 (50)	400 (50)

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for the clearing and grubbing of the construction area and required preparation at walks, pavements and roadways.

1.2. SYSTEM DESCRIPTION

- 1.2.1. Clearing shall consist of the cutting, removal, disposal and clean up of all timber and heavy brush except such trees and brush designated for preservation.
- 1.2.2. Grubbing shall consist of the excavation, removal, disposal and clean up of all roots, stumps, submerged logs, light brush, grain, grass, weeds, other annual plants, rubbish and similar objectionable matter.
- 1.2.3. Preparation of surfaces shall consist of:
- 1.2.3.1. Removal and disposal and clean up of walks, pavements and roadways as required for the work shown on the drawings and specified herein. Paved surfaces and traveled ways shall be cut ahead of the excavation by methods which shall provide clean uniform edges with minimum disturbance of remaining pavement.
 - 1.2.3.2. Removal and storage of topsoil and loam acceptable for reuse from areas to be excavated. If acceptable topsoil and loam are not separated and stored for reuse, the Contractor shall furnish, at the Contractor's expense, sufficient topsoil to meet the requirements of the work.
 - 1.2.3.3. Removal, storage and replacement, as necessary and to the owner's satisfaction, of mailboxes, street and road signs, street lights, traffic control devices, etc.
 - 1.2.3.4. Removal, storage and replacement of hedges, shrubs, fences, privately owned signs or other structures that lie within the right-of-way, easements, or on property where releases have been obtained by the owner which require removal due to direct conflict within the work.
- 1.2.4. Unless otherwise shown on the drawings, clearing and preparation of surfaces shall be performed only to the extent necessary to facilitate the construction of the work and shall not exceed the right-of-way, site or easement limits. Unless otherwise shown on the drawings, grubbing shall be limited to the area of excavation.

1.3. MATERIALS

- 1.3.1. Tree paint required for injuries to bark and to limbs or where branches have been removed shall be an asphalt base paint prepared specifically for tree surgery.

PART 3 EXECUTION

3.1. PREPARATION

- 3.1.1. Trees, shrubs and other landscape features which do not interfere with the work and are not designated for removal, relocation or replacement shall be suitably protected from damage, loss or injury during the construction operations. Trees shall be protected to the drip-line. No storage of excavated materials shall be permitted on or near the protected landscape features.

3.2. CONSTRUCTION

3.2.1. GENERAL

- 3.2.1.1. Burning of materials shall not be permitted.
- 3.2.1.2. Survey and reference points shall not be disturbed, if supplied by Engineer.
- 3.2.1.3. All materials not reusable shall become the property of the contractor and shall be disposed of promptly in accordance with the section "Waste Materials Disposal," Division 1 and not left until completion of the work.
- 3.2.1.4. Materials and debris shall not be placed or stored within the limits of any existing street or traveled way.
- 3.2.1.5. All injuries to bark, trunk, limbs and roots of trees and shrubs not designated for clearing, removal, relocation or replacement shall promptly be repaired by properly dressing, cutting, framing and painting using acceptable tree surgery methods, tools and materials.
- 3.2.1.6. All grass areas beyond the limits of the work that have been damaged shall be restored by acceptable seeding or sodding methods.

3.2.2. CLEARING AND GRUBBING

- 3.2.2.1. Only that portion of the right-of-way which is absolutely necessary and essential for the construction of the work shall be cleared. All clearing schedules shall be formulated to provide minimum practical exposure of soils, especially in critical impact areas. Ground disturbance shall be avoided until immediately preceding construction to minimize exposure of soils.

- 3.2.2.2. The Contractor shall make every effort to avoid the destruction of common native trees and shrubs so as not to unduly disturb the ecological or environmental quality of the area. Specimen trees and trees of 12-inch diameter and greater should be preserved whenever possible. The Contractor shall consider removing and storing those common native trees and shrubs of 1 to 3 inch caliper, which will be cleared from the right-of-way, for future transplanting to restore the right-of-way. Straggling roots shall be pruned. Trees which must be pruned shall be cut cleanly and painted with an approved, antiseptic, waterproof, asphalt based tree wound dressing which shall contain no coal-tar, creosote, oils, kerosene, turpentine, or other materials harmful to the living tissues of trees. If the tree is damaged, the wood shall be repaired and also painted with the tree wound dressing. After interfering vegetation has been removed, the Contractor shall strip any and all topsoil from the area to be excavated and stockpile it for restoration of the area.
- 3.2.2.3. Outside of areas to be grubbed, all trees, roots and stumps not designated for preservation shall be cut off flush with the original ground surface.
- 3.2.2.4. All suitable wood accumulated as a result of clearing and grubbing not otherwise disposed of shall be chipped. Wood chips shall be produced by a wood chipping machine and shall not contain leaves, twigs, branches, wood shavings, dirt, stones, clods of turf, foreign material or debris. Wood Chips shall be used for restoration and erosion control as required by the work.

3.2.3 PREPARATION OF SURFACES

- 3.2.3.1. Pavement shall not be mixed with other excavated materials.
- 3.2.3.2. If street and road signs are to be removed even for a short time, the State Police, local Police or appropriate public authority having jurisdiction shall be notified in advance. Resetting or restoration of street and road signs shall be in accordance with *N.Y.S. Manual of Uniform Traffic Control Devices*.

**** END OF SECTION ****

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for protecting, removing, relocating and replacing existing utilities and structures.

1.2. SYSTEM DESCRIPTION

- 1.2.1. Protection of existing utilities and structures not designated for removal, relocation or replacement are supplemental to the requirements of the general conditions.
- 1.2.1.1. The Contractor shall strictly comply with the requirements of the owners of existing utilities and structures including but not limited to those related to support, protection, inspection and testing.
- 1.2.1.2. As the excavation approaches utilities or underground structures, digging by machinery shall be discontinued until manual excavation properly locates the extent of the utility or structure.
- 1.2.2. In the event of damage, injury or loss to existing utilities and structures, whether shown on the drawings or not, the Contractor shall make all reasonable efforts to facilitate repairs and to mitigate the impact of such events upon the utility or structure's owner's normal operations. The Contractor shall be responsible for restoring the existing utility or structure to the condition required by the owner of the utility or structure, or at least to a condition found immediately prior to the work. In the event that the utility owner elects to repair, the Contractor shall provide all reasonable access and assistance and will reimburse the utility owner for the cost of the repair. If utility service is interrupted, alternate facilities shall be provided.
- 1.2.2.1. Backfilling around protected utilities and structures shall be in accordance with the Section "Trenching, Backfilling and Compaction," Division 2.
- 1.2.3. Re-routing of the work to avoid existing utilities and structures.

- 1.2.3.1. Where existing utilities and structures appear to be located differently than shown on the drawings as indicated by the mark out described in the Section "Utilities - Notification and Markout," Division 1, test pits as described in the Section "Test Pits for Verification of Utilities and Structures," Division 2, or by field observation, the Contractor shall notify the Engineer so that the work may be re-routed, if possible, to avoid interferences. Re-routing to avoid interferences shall be treated as a Minor Change thereby not involving an adjustment in the contract price or contract time.
- 1.2.4. Removal, relocation or replacement of existing utilities and structures.
- 1.2.4.1. Where shown on the drawings, the Contractor shall be responsible to remove, relocate or replace existing utilities and structures in accordance with the specific specifications section describing the item of work.
- 1.2.4.2. If removal, relocation or replacement of existing utilities and structures are required because of interference with the work, or by request of the utility owner, the change shall be in accordance with General Conditions.
- 1.2.4.3. Backfilling around relocated utilities, facilities, lines and structures shall be in accordance with the section "Trenching, Backfilling and Compaction," Division 2.
- 1.2.5. Work affecting existing gas distribution system shall be in accordance with the minimum federal safety standards under Title 49 -- Transportation, Chapter 1 -- Materials Transportation Bureau, Department of Transportation -- Part 192 -- Transportation of Natural and other Gas by Pipeline and The American Society of Mechanical Engineers' Guide material relating to the standards.
- 1.2.6. Work affecting water distribution systems which will take fire hydrants out of service must be coordinated with the local Water Department and Fire Department. The Contractor shall be prepared to take whatever measures are necessary to restore fire flows in the event of an emergency or provide for temporary fire flow service in accordance with the requirements of the local Fire Department.

1.2.7. DEFINITIONS

- 1.2.7.1. Interference with the work of utilities that may require re-routing or removal, relocation or replacement is defined as utilities that are either approximately parallel with the new pipeline and within the two vertical planes enclosed by the maximum trench width, as shown on the drawings, plus 6 inches on each side (total of 1 foot added to the maximum trench width) or crossing the pipe at any angle and at the same elevation as the proposed piping so as to be in direct conflict. All other utilities, including all house laterals and services, approximately parallel to the new pipeline but outside of the maximum trench width plus 1 foot, or crossing the pipe trench at any angle and not in direct conflict with the proposed piping are the obligation of the Contractor to remove, relocate or replace at no additional cost to the owner.
- 1.2.7.2. Utilities are defined as any pipelines, conduits, wires or other facilities that convey fuel, gas, water, sewage or storm water; transmit electricity, voice communications, television, signals or alarms; and similar related services.

PART 2 PRODUCTS

2.1. MATERIALS

- 2.1.1. All materials used for relocation or replacement of utilities and structures shall be of an equivalent material, type, class grade and construction as that existing, or as approved by the respective owners thereof.

**** END OF SECTION ****

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for grading in preparation for the placing of topsoil, planting areas, paved and unpaved walks, drives and traveled ways.

1.2. SYSTEM DESCRIPTION

- 1.2.1. The site shall be kept graded during performance of the work as required to prevent depressions which may form water pockets, and to permit movement of normal vehicular traffic.
- 1.2.2. Areas to receive pavements, walks and traveled ways shall be graded to bottom of base course or subbase course as applicable, and compacted as shown on the drawings or specified herein. After compaction, the subgrade of roadways or traveled ways shall be proof-rolled with a fully loaded tandem dump truck prior to the installation of subbase material. All areas that shown signs of distress, fatigue, or are determined by the Engineer or Highway Superintendent to be unsuitable shall be removed in accordance with Section 01030, "Special Project Requirements". A minimum of four (4) passes shall be made with the fully loaded tandem dump truck.
- 1.2.3. Select Material #4 shall be used to fill low areas in the roadway subgrade to bring it to the proper grade prior to the installation of the base course or subbase course.
- 1.2.4. Areas to receive topsoil shall be graded and compacted to the bottom of the topsoil layer.

PART 3 EXECUTION

3.1. PREPARATION

- 3.1.1. During the grading operation, the subgrade shall be maintained in such condition that it will be well drained at all times. Grading shall be performed to facilitate surface drainage away from buildings. No low areas shall remain which would inhibit proper surface drainage in any areas. If required, temporary drains and drainage ditches shall be installed to intercept or divert surface water which may affect the prosecution of the work, erode the subgrade or adversely affect adjacent properties.

- 3.1.2. Stones or rock fragments larger than 4 inches in their greatest dimension will not be permitted in the top 6 inches of the finished subgrade of all embankments.
- 3.1.3. In cuts, all loose or protruding rocks on the back slopes shall be barred loose or otherwise removed to line or finished grade of slope. All cut and fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown on the drawings.

** END OF SECTION **

PART 1 GENERAL

1.1. DESCRIPTION

1.1.1. Work covered by this section includes rock excavation and removal and disposal of boulders.

1.1.2. Definitions

1.1.2.1. Rock -- As a name for excavated materials, natural solid rock formation, including shale, which can be removed properly only by means of explosives, or by recognized methods of quarrying. The term rock, for payment purposes, shall specifically exclude all loose, soft stratified deposits, and any other material which can be removed by mechanical equipment. Minimum size of mechanical equipment used to try and remove material shall be a Cat 245 hydraulic track excavator, or approved equivalent, with a 2' wide bucket. Teeth on excavator bucket shall be in good condition. Such excluded materials may include shale, slate, soft sandstone, nested boulders, or other material which is decomposed, stratified or shattered. In no case will excavated materials be paid for as rock excavation without first being loosened by ram hoe or drilling and/or blasting operations. Such excluded materials shall further include previously blasted rock, loose shakes, broken rock in fillings, materials which may be removed with pick and material which has fallen into the trench or excavation.

1.1.2.2. Boulder -- As a name for excavated materials, boulders, rock and large cobbles, one (1) cubic yard or greater in volume, regardless of the size of equipment used to excavate such materials. The term boulder, for payment purposes shall specifically exclude materials with a solid volume of less than one (1) cubic yard.

1.2. SUBMITTALS

1.2.1. Name, qualifications and experience record of all blasters.

1.2.2. Certificates of insurance and license of blaster.

1.2.3. Pre-blasting photographs as specified in Section 01300.

1.2.4. Blasting permit obtained from municipality.

PART 3 EXECUTION

3.1. INSPECTION

- 3.1.1. Verify that blasting operations will not violate the boundaries of easements or property lines.
- 3.1.2. Determine the locations of structures and underground utilities, and verify that blasting operations will not disturb them.
- 3.1.3. **Notify the Construction Observer and Highway Superintendent, who will inspect and determine if the material is to be qualified as rock, boulders, or otherwise, and who will further take measurements to determine the volume thereof, assisted by the Contractor, after the initial stripping of earth. If Construction Observer and Highway Superintendent are not notified, Contractor shall not be paid for rock removal.**

3.2. PERFORMANCE

- 3.2.1. At the direction of the Engineer, attempt to remove materials by use of mechanical equipment.
- 3.2.2. When rock is encountered, excavate the same as required for the construction of the work. No projection of rock shall be allowed to remain nearer than 6" to any part of a pipe or conduit when laid, nor to project beyond the lines and grades of any masonry structure, not so as to interfere with the proper construction and removal of forms. Where masonry will be in contact with rock, the surface of the rock shall be rough and clean, in order to secure a good bond. Before rock is excavated, it shall be stripped of earth, and the Engineer notified and given time to measure the same. All rock and boulders removed before measurement by the Engineer will not be paid for as Rock Excavation or Removal and Disposal of Boulders.
- 3.2.3. Where the material cannot be reasonably removed by mechanical equipment, it shall be removed by drilling and blasting; drilling, jack-hammering, plug and feather; or by other recognized quarrying methods; in which case the material will be considered as rock excavation.
- 3.2.4. If rock is encountered, it shall be removed to 6" below the footing, base slab, or proposed pipe and the area brought back to proper subgrade by placing a 6" minimum layer of compacted select backfill. The cost of the select backfill will be included in the price per cubic yard of rock, unless otherwise specified.
- 3.2.5. Where rock is encountered in right-of-way, close to houses or other structures, or adjacent to watermains, gas mains, or electrical underground installations, special precautions shall be observed. In some cases, the Engineer may require that the rock be removed without the use of explosives.

- 3.2.6. Remove and dispose of all boulders and excavated rock as specified in Section 02221 for excess excavated materials, unless otherwise directed by the Engineer.

3.3. BLASTING

- 3.3.1. All damages to persons and public and private property shall be the responsibility of and adjusted by the Contractor. Conduct all operations so as to circumvent and minimize such instances inasmuch as is possible.
- 3.3.2. Conduct all operations, including the use of air compressors and air hammers, in full conformance with all applicable laws and regulations.
- 3.3.3. All blasting operations shall be performed by a qualified, licensed blaster.
- 3.3.4. In all cases of blasting, the prepared blast shall be carefully covered with heavy timers securely chained together and covered with a blasting mat and placed so that the area affected by the explosives is positively confined. No blasting shall be done within 40 feet of finished pipelines, and shall a gas or sewer pipe or any underground conduit intersect the line of trench, the rock shall be removed without blasting for a distance of 10 feet on each side of such pipes or conduits. The end of the finished pipeline shall be covered and stopped with plank or earth during each blast.
- 3.3.5. Charges shall be properly sized, and mitigating measures properly employed, to limit the effect of blasting (including pre-blasting) to the trench or excavation limits. All damages and disturbance to roadway and other surfaces, bases, sub-bases, and earth outside of the trench or excavation limits shall be repaired to the complete satisfaction of the Engineer, with no additional compensation to the Contractor therefore. If, in the opinion of the Engineer, road sub-bases or earth layers have been disturbed, with or without evidence of such opinion, further subsidence may occur, said disturbed areas shall be excavated and reconstructed to the complete satisfaction of the Engineer, entirely at the Contractor's expense.

PART 4 MEASUREMENT AND PAYMENT

4.1. MEASUREMENT

- 4.1.1. Measurement for boulder removal is by the cubic yards actually removed. Measurement for rock removal excavation is defined by the maximum width equal to the outside diameter of the pipe or width footing or a structure plus 12" either side by the depth of the rock to a maximum depth of 6" below the pipe or structure.

4.2. PAYMENT

- 4.2.1. Unit price for rock excavation includes ram hoe, drilling, explosives, preparation of area for blasting, labor, all equipment required for mechanical removal of rock where required, pre-blast surveys, disposal of the rocks, 6" depth of select backfill under structure or pipes, and all else incidental and necessary to complete the work.
- 4.2.2. Price for boulder removal includes all equipment and labor required for removal and disposal of the boulders, and all else incidental and necessary to complete the work. Boulders will be paid for on the basis of ½ the rock excavation price.

** END OF SECTION **

SECTION 02224
UNSUITABLE, SUITABLE AND SELECT MATERIAL

PART 1 GENERAL

1.1. SECTION INCLUDES

1.1.1. Requirements, definitions and uses for unsuitable, suitable and select material.

1.2. SYSTEM DESCRIPTION

1.2.1. UNSUITABLE MATERIAL -- DEFINITION

1.2.1.1. Excavated materials shall be unsuitable for use if the excavated material contains objectionable quantities of organic matter, clays, trees, stumps, frozen material, rubble, refuse, cinders, rock, asphalt or other material considered deleterious by the Engineer, which in the opinion of the Engineer can not be removed by the Contractor.

1.2.1.2. The soil material at or below subgrade or excavation depth as shown on the drawings shall be unsuitable if the soils will not serve as an adequate foundation for the work, and/or show signs of distress or fatigue.

1.2.2. SUITABLE MATERIAL -- DEFINITION

1.2.2.1. Suitable materials from excavations shall be free from or in the opinion of the Engineer can be made free of objectionable quantities of organic matter, clays, trees, stumps, frozen material, rubble, refuse, cinders, rock, asphalt and other material considered deleterious by the Engineer, nor stones larger than ½ cubic foot, except for backfill within the initial backfill zone where no stones shall be larger than 2".

1.2.2.2. Suitable material from off-site borrow pits shall meet the requirements of 2.1.1.

1.2.3. SELECT MATERIAL -- DEFINITION

1.2.3.1. Select materials shall be as described in 2.1.2.

1.3. QUALITY ASSURANCE

1.3.1. Testing will be performed by an approved independent testing lab, at the Contractor's cost, at Engineer's direction.

1.4. REFERENCES

- 1.4.1. "Tests for Moisture-Density Relations of Soils," ASTM designation as shown on the drawings.
- 1.4.2. NYSDOT Standard Specifications.
- 1.4.3. "Standard Specifications for Transportation Materials and Method of Sampling and Testing," AASHTO.

1.5 SUBMITTALS

- 1.5.1. Samples of imported materials shall be submitted for testing and approval before execution of work.

PART 2 PRODUCTS

2.1 MATERIALS

- 2.1.1. Suitable material from off-site borrow pits (run of bank) shall consist of a natural or artificial mixture hard, durable pebbles, rock fragments and soil binder, free from soft particles and excess clay, and shall be graded as follows:

Sieve Size	Percent Passing (By Weight)
4 inch	100
¼ inch	25 - 60
No. 200	0 - 20

2.1.2. SELECT MATERIAL

- 2.1.2.1. Select Material No. 1 (crushed stone or pea gravel stone) shall be graded as follows:

Sieve Size	Percent Passing (By Weight)
¾ inch	100
½ inch	90 - 100
3/8 inch	40 - 70
No. 4	0 - 15
No. 8	0 - 5

- 2.1.2.2. Select Material No. 2 (crushed stone #2 – NYSDOT Table 703-4) shall conform to NYSDOT Section 703 – Aggregates, and shall be graded as follows:

Sieve Size	Percent Passing (By Weight)
1½ inch	100
1 inch	90 - 100
½ inch	0 - 15

- 2.1.2.3. Select Material No. 3 (sand) shall be clean and shall be graded as follows:

Sieve Size	Percent Passing (By Weight)
No. 4	90-100
No. 8	75-100
No. 16	50-85
No. 30	25-60
No. 50	10-30
No. 100	1-10
No. 200	0 - 3

- 2.1.2.4. Select Material No. 4 (manufactured quarry processed stone) shall conform to the requirements of the NYSDOT Standard Specifications for NYSDOT Item No. 304.12, and shall be graded as follows:

Sieve Size	Percent Passing (By Weight)
2 inch	100
¾ inch	25 - 60
No. 40	5 - 40
No. 200	0 - 10

- 2.1.2.5. Select Material No. 5 (crushed stone #3A - NYSDOT Table 703-4) shall conform to NYSDOT Section 703-Aggregates, and shall be graded as follows:

Sieve Size	Percent Passing (By Weight)
2 inch	100
1½ inch	90 -100
1 inch	0 - 15

- 2.1.2.6. Select Material No. 6 (crushed stone #3 - NYSDOT Table 703-4) shall conform to NYSDOT Section 703 - Aggregates, and shall be graded as follows:

Sieve Size	Percent Passing (By Weight)
2½ inch	100
2 inch	90 - 100
1½ inch	35 - 70
1 inch	0 - 15

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1. USE OF SUITABLE MATERIAL

- 3.1.1.1. Where shown on the drawings, or if there is not sufficient excavated material suitable for use to fulfill the requirements of the work, sufficient suitable material to meet the requirements of the work shall be imported from off site borrow pits and placed and compacted in accordance with the Section "Soil Compaction," Division 2.

3.1.2. USE OF SELECT MATERIAL

- 3.1.2.1. Where shown on the drawings, or if in the opinion of the Engineer a select material is necessary for use above subgrade, the designated select material shall be provided.
- 3.1.2.2. Where shown on the drawings, or if in the opinion of the Engineer the foundation soils at or below subgrade shall be considered unsuitable as an adequate foundation material for the work, a designated select material as shown on the drawings or as determined by the Engineer, shall be used to replace the unsuitable material.

- 3.1.2.3. Unsuitable soils shall be removed to such widths and to such depths as determined by the Engineer to provide for suitable support.
- 3.1.2.4. The designated select material shall be provided, placed and compacted in accordance with the Section "Soil Compaction", Division 2.

PART 4 MEASUREMENT AND PAYMENT

4.1. MEASUREMENT

- 4.1.1. Measurement of suitable material from off site sources is by cubic yards of unsuitable material removed from within the pay limits shown or ordered by the Engineer, that is replaced by the suitable material (compacted).
- 4.1.2. Measurement of select material is by cubic yards in place (compacted) within the pay limits shown or ordered by the Engineer, except when begin used as road subgrade material, at which time it will be paid by the square yard.

4.2. PAYMENT

- 4.2.1. Unit price for suitable material from off site sources includes excavating and disposal of unsuitable and/or unused material, dewatering, furnishing and compacting the suitable material and all else incidental and necessary to complete the work.
- 4.2.2. Unit price for select material below subgrade includes excavating and disposing of unsuitable and/or unused material, dewatering, furnishing and compacting the select material, protection of the excavation and all else incidental and necessary to complete the work.
- 4.2.3. Unit price for select material above subgrade includes excavation to the required subgrade; preparation of the subgrade; stockpiling of suitable material and disposal of unsuitable and/or unused material; furnishing, placing and compacting the select material, and all else incidental and necessary to complete the work.

**** END OF SECTION ****

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for bedding and backfilling in the pipe embedment zone.

1.2. SYSTEM DESCRIPTION

- 1.2.1. The pipe embedment zone for each type of pipe is shown on the drawings. The pipe embedment zone is founded on the planned subgrade of undisturbed earth or schedule rock excavation and does not include the zone of unauthorized excavation or select material below subgrade replacing unsuitable foundation material.
- 1.2.2. Unless otherwise stated, the pipe embedment zone consists of:
- 1.2.2.1. Bedding which may be either undisturbed earth, suitable material, or select material.
 - 1.2.2.2. Compacted backfill of suitable material or select material. Suitable excavated material shall be used if available. If suitable excavated material is not available, off-site suitable material or select material as shown on the drawings shall be used.

1.3. SUBMITTALS

- 1.3.1. Submit all relative materials specifications and samples including void ratio of crushed stone bedding in conformance with provisions of the Section "Shop Drawings and Samples", Division 1.

PART 2 PRODUCTS

2.1 MATERIALS

- 2.1.1. Unless otherwise shown on the drawings, material for the pipe embedment zone shall be suitable material as specified in the Section "Unsuitable, Suitable and Select Materials", Division 2.
- 2.1.2. Select material for pipe embedment zone backfill, if required, shall meet the requirements as specified in the Section "Unsuitable, Suitable and Select Materials", Division 2.

PART 3 EXECUTION

3.1. INSTALLATION

- 3.1.1. Bedding on undisturbed earth. The trench excavation in the pipe embedment zone shall be executed in conformance with the requirements as stated in "Trenching, Backfilling and Compaction", Division 2. The undisturbed soil shall have contact with the pipe for an angle of at least 90°, unless otherwise shown on the drawings.
- 3.1.2. Pipe embedment zone backfill. Suitable or select material shall be deposited and compacted in layers not to exceed 6" until a minimum of 1 foot of earth has been placed and compacted over the pipes in a manner that will not disturb or injure the pipe. Each layer shall be leveled and thoroughly compacted in accordance with the Section "Soil Compaction", Division 2.

PART 4 MEASUREMENT AND PAYMENT

4.1. MEASUREMENT

- 4.1.1. Measurement of select material used as pipe embedment backfill when authorized by the Engineer is on a cubic yard basis as stated in "Unsuitable, Suitable and Select Materials", Division 2, unless requested to be included in the unit price for pipe.
- 4.1.2. Measurement of suitable material from excavations used as pipe embedment backfill shall not be made.
- 4.1.3. Measurement of suitable materials from off-site sources as pipe embedment backfill when authorized by the Engineer is on a cubic yard basis as stated in "Unsuitable, Suitable and Select Materials", Division 2, unless requested to be included in the unit price for pipe.

4.2. PAYMENT

- 4.2.1. Unit price for select material used as pipe embedment backfill when authorized by the Engineer is described in Part 4, "Unsuitable, Suitable and Select Materials" Division 2.
- 4.2.2. There is no unit price payment for suitable material from excavations used as pipe embedment backfill. The price shall be included in the unit prices bid for pipe.
- 4.1.3. Unit price for suitable materials from off-site sources as pipe embedment backfill when authorized by the Engineer is described in Part 4 of the Section "Unsuitable, Suitable and Select Materials", Division 2.

**** END OF SECTION ****

SECTION 02250
SOIL COMPACTION

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for soils compaction.

1.2. QUALITY ASSURANCE

- 1.2.1. The taking of samples and the performing of field compaction density tests shall be done by an approved independent testing laboratory, obtained and paid for by the Contractor.

1.3. SUBMITTALS

- 1.3.1. Copies of the results of the laboratory maximum density tests, certified by the Testing Laboratory.

- 1.3.2. List and description of proposed compaction equipment.

1.4. JOB CONDITIONS

- 1.4.1. Compaction shall not take place in freezing weather or when materials to be completed are frozen, too wet or moist, or too dry.
- 1.4.2. Schedule the work to allow ample time for laboratory tests and to permit the collecting of samples and the performing of field density tests during the backfilling and compaction operations.
- 1.4.3. Protect pipes, structures and all other subsurface work from displacement or injury during compaction operations.

PART 2 PRODUCTS

2.1. COMPACTION

- 2.1.1. Utilize the proper compaction methods and equipment to suit the soils and conditions encountered.
- 2.1.2. Foundation course material placed on finished subgrade shall be thoroughly compacted by rolling with a self-propelled ten ton roller.

2.2. LABORATORY TEST REPORTS

2.2.1. As a minimum, the laboratory maximum density testing reports shall contain the following:

- 2.2.1.1. Laboratory's name.
- 2.2.1.2. Date, time and specific location from which sample was taken and name of person who collected the sample.
- 2.2.1.3. Moisture-Density Curve plotted on graph paper to as large a scale as is practical, with all points used to derive the curve clearly visible.
- 2.2.1.4. Designation of the test method used.
- 2.2.1.5. The optimum density and moisture content.
- 2.2.1.6. A description of the sample.
- 2.2.1.7. The date the test was performed and the person who performed the test.
- 2.2.1.8. The project name and identification, and the Contractor's name.
- 2.2.1.9. The signature of a responsible officer of the Testing Laboratory certifying to the information contained in the report.

PART 3 EXECUTION

3.1. INSPECTION

- 3.1.1. Verify that layers of material are no thicker than the maximum thicknesses specified in other sections.
- 3.1.2. Verify that moisture content is nearly optimum.

3.2. PERFORMANCE

- 3.2.1. Compaction densities shown are percentages of the maximum density obtainable at optimum moisture content as determined by ASTM D1557, Method C.

- 3.2.2. Moisten or dry each layer of material to achieve optimum moisture content. Unless otherwise specified or directed by the Engineer, compact each layer of material to the following required densities:

Location	Density
Under concrete slabs, foundation and footings	95% * 100% **
Backfill at structures	95%
Embankments	95%
Paved Areas	95%
All Other Areas Select Fill *** Remainder of Trench	95% 90%

* For cohesive materials.

** For granular materials.

*** Bedding, around pipes, over pipes and over sand encasements.

3.3. FIELD QUALITY CONTROL

- 3.3.1. Field density tests shall be done, at the contractor's expense in accordance with the following average frequencies:

- 3.3.1.1. Structures and Roads -- One test for each layer of compacted fill and base material at intervals of approximately 100 feet along structure walls and roadways.
- 3.3.1.2. Under Structures, Foundations, Slabs and Footings -- One test for every 40 square foot area of each layer of compacted fill or backfill.
- 3.3.1.3. Trenches and All Other Areas -- One test for every 50 feet of trench for each lift of backfill, and one test for every 40 square foot area of each layer of compacted fill or backfill in all other areas.

3.4. ADJUST AND CLEAN

- 3.4.1. Replace or repair any pipe, structure or other work which has been displaced, damaged or injured.
- 3.4.2. Compacted soils not meeting compaction densities shall be re-excavated, recompacted and retested until all requirements are met.

** END OF SECTION **

SECTION 02315**EXCAVATION, BACKFILL, COMPACTION AND DEWATERING****PART 1 GENERAL****1.1 SUMMARY****A. Section Includes**

1. Excavation, backfill and compaction for underground structures
2. Excavation, backfill and compaction for subsurface utilities
3. Removal, handling and disposal of rock not covered under Section 02211
4. Earth retention systems
5. Excavation, backfill and compaction for the abandonment of existing pipe
6. Temporary dewatering systems

B. Related Sections

1. Section 02224 - Unsuitable, Suitable and Select Material
2. Section 02211 - Rock Removal

1.2 REFERENCES

- A. ASTM D1557-07 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³))
- B. ASTM D1556-07 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
- C. ASTM D2487-06e1 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- D. ASTM D6938-08a - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
- E. 29 CFR Part 1926 Subpart P - OSHA Excavation Regulations 1926.650 through 1926.652 including Appendices A through F
- F. NYSDEC Standards and Specifications for Erosion and Sediment Control, Latest Edition
- G. NYSDEC Stormwater Management Design Manual, Latest Edition

1.3 DEFINITIONS

- A. Benching - A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

- B. Earth Retention Systems - Any structural system, such as sheeting and bracing or cofferdams, designed to retain in-situ soils in place and prevent the collapse of the sides of an excavation in order to protect employees and adjacent structures.
- C. Excavation - Any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.
- D. Protective System - A method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include earth retention systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.
- E. Registered Professional Engineer - A person who is registered as a professional engineer in the state where the work is to be performed. However, a professional engineer, registered in any state is deemed to be a "registered professional engineer" within the meaning of this standard when approving designs for "manufactured protective systems" or "tabulated data" to be used in interstate commerce.
- F. Shield System - A structure that is designed to withstand the forces imposed on it by a cave-in and thereby protects employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shields can be either pre-manufactured or job-built in accordance with 29 CFR 1926.652(c)(3) or (c)(4). Shields used in trenches are usually referred to as "trench boxes" or "trench shields."
- G. Sloping - A method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.
- H. Temporary Dewatering System - A system to lower and control water to maintain stable, undisturbed subgrades at the lowest excavation levels. Dewatering shall be provided for all pipelines, structures and for all other miscellaneous excavations.
- I. Trench - A narrow excavation (in relation to its length) made below the surface of the ground, of at least three feet in depth. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 m).

1.4 SUBMITTALS

- A. Drawings and calculations for each Earth Retention System required in the Work. The submittal shall be in sufficient detail to disclose the method of operation for each of the various stages of construction required for the completion of the Earth Retention Systems.
 - 1. Reference is made to the report entitled "Geotechnical Investigation: West Main Street Pump Station Upgrades" prepared by GZA GeoEnvironmental of New York dated April 14, 2022. Contractor shall comply with the report recommendations for the preparation of a Support of Excavation Submittal. Each submittal must contain designs and calculations stamped and sealed by a New York Professional Engineer.

- B. Performance data for the compaction equipment to be utilized
- C. Construction methods that will be utilized for the removal of rock

- D. Modified Proctor Test (ASTM D1557) results and soil classification (ASTM D2487) for all proposed backfill materials at the frequency specified below:
1. For suitable soil materials removed during Excavation, perform one test for every 1,000 cubic yards of similar soil type. Similarity of soil types will be as determined by the Engineer.
 2. For borrow materials; perform tests at frequency specified in Section 02224, Borrow Materials.
- E. Compaction test results (i.e. ASTM D6938 or ASTM D1556) at a frequency of one test for every 100 cubic yards of material backfilled or at a minimum of one test per lift. The Engineer will determine the locations and lifts to be tested. The Contractor shall plan his operations to allow adequate time for laboratory tests and to permit taking of field density tests during compaction.
1. Methods and equipment proposed for compaction shall be subject to prior review by the Engineer. Compaction generally shall be done with vibrating equipment. Static rolling without vibration may be required by the Engineer on sensitive soils that become unstable under vibration. Displacement of, or damage to existing utilities or structure shall be avoided. Any utility or structure damaged thereby shall be replaced or repaired as directed by the Engineer.
 2. Additional compaction testing may be required when there is evidence of a change in the quality of moisture control or the effectiveness of compaction.
 - a. Any costs associated with correcting and retesting as a result of a failure to meet compaction requirements shall be borne by the Contractor.
 3. If all compaction test results within the initial 25% of the total anticipated number of tests indicate compacted field densities equal to or greater than the project requirements, the Engineer may reduce frequency of compaction testing. In no case will the frequency be reduced to less than one test for every 500 cubic yards of material backfilled.
 4. The Contractor is cautioned that compaction testing by nuclear methods may not be effective where trenches are so narrow that trench walls impact the attenuation of the gamma radiation, when adjacent to concrete that impacts the accuracy of determining moisture content, or where oversize particles (i.e. large cobbles or coarse gravels) are present. In these cases, other field density testing methods may be required.
- F. Dewatering plan for the pump station excavation:
1. Reference is made to the report entitled "Geotechnical Investigation: West Main Street Pump Station Upgrades" prepared by GZA GeoEnvironmental of New York dated April 14, 2022. Contractor shall comply with the report recommendations for the preparation of a Dewatering Submittal. Each submittal must contain designs and calculations stamped and sealed by a New York Professional Engineer.

1.5 QUALITY ASSURANCE

- A. All Excavation, Trenching, and related Earth Retention Systems shall comply with the requirements of OSHA excavation safety standards (29 CFR Part 1926 Subpart P), 520 CMR 14.00, and other State and local requirements. Where conflict between OSHA and State regulations exists, the more stringent requirements shall apply.
- B. Employ the services of a dewatering specialist or firm when well points, deep wells, recharge systems, or equal systems are required. Specialist shall have completed at least 5 successful dewatering projects of equal size and complexity and with equal systems.

1.6 PROJECT CONDITIONS

- A. Notify Dig Safely New York and obtain Dig Safely New York identification numbers.
- B. Notify utility owners in reasonable advance of the work and request the utility owner to stake out on the ground surface the underground facilities and structures. Notify the Engineer in writing of any refusal or failure to stake out such underground utilities after reasonable notice.
- C. Make explorations and Excavations to determine the location of existing underground structures, pipes, house connection services, and other underground facilities in accordance with Paragraph 3.2.D of this Section.
- D. No person shall, except in an emergency, make an excavation in any public way, public property, or privately owned land until a permit is obtained from the appropriate designated permitting authority. For this project, the permit should be obtained from the City of Beacon.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

- A. Fill material is subject to the approval of the Engineer and may be either material removed from excavations or borrow from off site. Fill material, whether from the excavations or from borrow, shall be of such nature that after it has been placed and properly compacted, it will make a dense, stable fill.
- B. Satisfactory fill materials shall include materials classified by ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, SW, and SP.
- C. Satisfactory fill materials shall not contain trash, refuse, vegetation, masses of roots, individual roots more than 18 inches long or more than 1/2 inch in diameter, or stones over 6 inches in diameter. Unless otherwise stated in the Contract Documents, organic matter shall not exceed minor quantities and shall be well distributed.
- D. Satisfactory fill materials shall not contain frozen materials nor shall backfill be placed on frozen material.
- E. Excavated surface and/or pavement materials such as gravel or trap rock that are salvaged may be used as a sub-grade material, if processed to the required gradation and compacted to the required degree of compaction. In no case shall salvaged materials be substituted for the required gravel base.

2.2 DEWATERING MATERIALS

- A. Provide haybales and silt fence in accordance with Section 01568.
- B. Provide silt filter bags (Dandy Dewatering Bag, Dirtbag, JMP Environ-Protection Filter Bag, or equal) of adequate size to match flow rate.
- C. Provide dewatering equipment and materials for engineered dewatering systems.

PART 3 EXECUTION

3.1 PREPARATION

A. Public Safety and Convenience

1. Take precautions for preventing injuries to persons or damage to property in or about the Work.
2. Provide safe access for the Owner and Engineer at site during construction.
3. Do not obstruct site drainage, natural watercourses or other provisions made for drainage.

3.2 CONSTRUCTION

A. Earth Retention Systems

1. Provide Earth Retention Systems necessary for safety of personnel and protection of the Work, adjacent work, utilities and structures.
2. Maintain Earth Retention Systems for the duration of the Work.
3. Sheeting
 - a. Systems shall be constructed using interlocking corner pieces at the four corners. Running sheet piles by at the corners, in lieu of fabricated corner pieces, will not be allowed.
 - b. Drive sheeting ahead of and below the advancing excavation to avoid loss of materials from below and from in front of the sheeting.
 - c. Sheeting is to be driven to at least the depth specified by the designer of the earth retention system, but no less than 2 feet below the bottom of the Excavation.
4. Remove earth retention system, unless designated to be left in place, in a manner that will not endanger the construction or other structures. Backfill and properly compact all voids left or caused by the withdrawal of sheeting.
 - a. Remove earth retention systems, which have been designated by the Engineer to be left in place, to a depth of 3 feet below the established grade.

B. Excavation

1. Perform excavation to the lines and grades indicated on the Drawings. Backfill unauthorized over-excavation in accordance with the provisions of this Section.
2. Excavate with equipment selected to minimize damage to existing utilities or other facilities. Hand excavate as necessary to locate utilities or avoid damage.
3. Sawcut the existing pavement in the vicinity of the excavation prior to the start of excavation in paved areas, so as to prevent damage to the paving outside the requirements of construction.

4. Perform excavation in such a manner as to prevent disturbance of the final subgrade. The Engineer or Owner may require the final six inches of excavation be performed by hand, with the use of a smooth-faced bucket, or other means acceptable to the Engineer or Owner, at no additional cost if subgrade disturbance is considered excessive as judged by the Engineer or Owner.
5. During excavation, material satisfactory for backfill shall be stockpiled in an orderly manner at a distance from the sides of the excavation equal to at least one half the depth of the excavation, but in no case closer than 2 feet.
 - a. Excavated material not required or not suitable for backfill shall be removed from the site.
 - b. Perform grading to prevent surface water from flowing into the excavation.
 - c. Pile excavated material in a manner that will endanger neither the safety of personnel in the excavation nor the Work itself. Avoid obstructing sidewalks and driveways.
 - d. Hydrants under pressure, valve pit covers, valve boxes, manholes, curb stop boxes, fire and police call boxes, or other utility controls shall be left unobstructed and accessible until the Work is completed.
6. Grade or create berms or swales to direct surface water from excavations to appropriate structures designed to accommodate storm water. If no structures exist, direct water to areas that minimize impacts to adjacent structures and properties.
7. Make pipe trenches as narrow as practicable and keep the sides of the trenches undisturbed until backfilling has been completed. Provide a clear distance of 12 inches on each side of the pipe.
8. Perform the excavation in such a manner as to prevent disturbance of the final subgrade. If excessive subgrade disturbance is occurring, as judged by the Owner or Engineer, then the final 6 inches of the excavation shall be performed by hand, with the use of a smooth-faced bucket, or other means acceptable to the Engineer or Owner.
 - a. Grade the excavation bottom to provide uniform bearing and support for the bottom quadrant of each section of pipe.
 - b. Excavate bell holes at each joint to prevent point bearing.
 - c. Remove stones greater than 6 inches in any dimension from the bottom of the trench to prevent point bearing.
9. All excavated material from the pump station site shall be removed and properly disposed of as stated in the General Notes. Backfill the resulting extra depth of excavation with satisfactory fill materials and compact in accordance with the provisions of this Section.

C. Backfill and Compaction

1. Borrow Material shall be used for backfilling all excavations on the pump station site. Spread and compact the material promptly after it has been deposited. When, in the Engineer's judgment, equipment is inadequate to spread and compact the material properly, reduce the rate of placing of the fill or employ additional equipment.
2. Prior to backfilling or placement of structures, excavated subgrades shall be proof compacted with either 10 passes of a 10-ton vibratory drum roller for open excavations or 6 passes of a large, reversible, walk behind vibratory compactor capable of exerting a minimum force of 2,000 pounds in trench or pit excavations. Soft or weak spots shall be over-excavated and replaced with compacted Granular Fill or compacted Crushed Stone wrapped in a non-woven geotextile, as directed by the Owner or their representative. If proof compaction will prove detrimental to the subgrade due to the presence of groundwater, static rolling may be allowed at the discretion of the Engineer or Owner.
3. Soil bearing surfaces shall be protected against freezing and the elements before and after concrete placement. If construction is performed during freezing weather, structures shall be backfilled as soon as possible after they are constructed. Insulating blankets or other means shall be used for protection against freezing at the discretion of the Engineer or Owner.
4. Backfilling and compaction methods shall attain 95% of maximum dry density at optimum moisture content as determined in accordance with ASTM D1557.
5. Do not place stone or rock fragment larger than six inches in greatest dimension in the backfill.
6. Maximum loose lift height for backfilling existing or borrow material shall be 12 inches, unless satisfactory compaction is demonstrated otherwise to the Engineer through field-testing. In no case shall loose lift height for backfilling exceed 3 feet.
7. Do not drop large masses of backfill material into the trench endangering the pipe or adjacent utilities.
8. Install pipe in rock excavated trenches on a dense graded stone bedding with a minimum depth of 6 inches. Shape the stone bedding at the pipe bells to provide uniform support. Encase the pipe in the dense graded crushed stone bedding to a grade 6 inches over the top of the pipe and 12 inches on each side of the pipe.
9. Backfill from the bottom of the trench to the centerline of the pipe with the specified material. This initial backfill is to be placed in layers of no more than 6 inches and thoroughly tamped under and around the pipe. This initial backfilling shall be deposited in the trench for its full width on both sides of the pipe, fittings and appurtenances simultaneously.
10. Electrical conduit not encased in concrete, shall be backfilled with sand borrow conforming to the requirements of Section 02224. The backfill shall be placed in the trench for its full width and shall extend to 12 inches over the conduit.

11. Where excavation is made through permanent pavements, curbs, paved driveways, or paved sidewalks, or where such structures are undercut by the excavation, place the entire backfill to sub-grade with granular materials and compact in 6 inch layers. Use approved mechanical tampers for the full depth of the trench. If required, sprinkle the backfill material with water before tamping so as to improve compaction. Any trenches improperly backfilled, or where settlement occurs, shall be reopened to the depth required to correct the problem, and shall then be refilled and properly compacted with the surface restored to required grade at no additional expense.
12. The Contractor shall not place backfill against or on structures until they have attained sufficient strengths to support the loads to which they will be subjected, without distortion, cracking, or other damage. As soon as possible after the structures are adequate, they shall be backfilled with suitable backfill material.
13. Place and compact backfill around manholes, vaults, pumping stations, gate boxes or other structures in six inch layers, from a point one foot over the pipe. Exercise care to protect and prevent damage to the structures.
14. Install impervious trench dams where stone borrow is used for pipe bedding to prevent groundwater from following along the stone bedding. Install dams every 100 feet.

D. Test Pit Excavation

1. General requirements of test pits are specified in Section 02015.

E. Dewatering

1. Provide, operate and maintain adequate pumping, diversion and drainage facilities in accordance with the approved dewatering plan to maintain the excavated area sufficiently dry from groundwater and/or surface runoff so as not to adversely affect construction procedures nor cause excessive disturbance of underlying natural ground. Locate dewatering system components so that they do not interfere with construction under this or other contracts.
2. Conduct operations so as to prevent at all times the accumulation of water, ice and snow in excavations or in the vicinity of excavated areas so as to prevent water from interfering with the progress or quality of the work.
3. Take actions necessary to ensure that dewatering discharges comply with permits applicable to the Project. Dispose of water from the trenches and excavations in such a manner as to avoid public nuisance, injury to public health or the environment, damage to public or private property, or damage to the work completed or in progress.
4. Repair any damage resulting from the failure of the dewatering operations and any damage resulting from the failure to maintain all the areas of work in a suitable dry condition.
5. Exercise care to ensure that water does not collect in the bell or collar holes to sufficient depth to wet the bell or collar of pipes waiting to be jointed.

6. Take precautions to protect new work from flooding during storms or from other causes. Control the grading in the areas surrounding all excavations so that the surface of the ground will be properly sloped to prevent water from running into the excavated area. Where required, provide temporary ditches for drainage. Upon completion of the work, all areas shall be restored to original condition.
7. Brace or otherwise protect pipelines and structures not stable against uplift during construction.
8. Do not excavate until the dewatering system is operational and the excavation may proceed without disturbance to the final subgrade.
9. Unless otherwise specified, continue dewatering uninterrupted until the structures, pipes, and appurtenances to be installed have been completed such that they will not float or be otherwise damaged by an increase in groundwater elevation.
10. Temporarily lower the groundwater level at least two feet below excavations to limit potential "boils," loss of fines, or softening of the ground. If any of these conditions are observed, submit a modified dewatering plan to the Engineer within 48 hours. Implement the approved modified plan and repair any damage incurred.
11. When subgrades are soft, weak, or unstable due to improper dewatering techniques, remove and replace the materials in accordance with Section 02320 at no cost to the Owner.
12. Notify the Engineer immediately if any settlement or movement is detected of survey points adjacent to excavations being dewatered. If settlement is deemed by the Engineer to be related to the dewatering, submit a modified dewatering plan to the Engineer within 24 hours. Implement the approved modified plan and repair any damage incurred to the adjacent structure at no cost to the Owner.
13. Dewatering discharge:
 - a. Dewater discharge shall be in accordance with the recommendation of the Limited Phase 2 site Assessment.
 - b. The Engineer reserves the right to sample discharge water at any time.
14. Install erosion/sedimentation controls for velocity dissipation at point discharges onto non-paved surfaces.
15. Removal
 - a. Do not remove dewatering system without written approval from the Engineer.
 - b. Backfill and compact sumps or ditches with screened gravel or crushed stone in accordance with Section 02224.
 - c. Remove well points and deep wells. Backfill abandoned well holes with cement grout having a water cement ratio of 1 to 1 by volume.

3.3 PROTECTION

A. Protection of Existing Structures

1. All existing foundations, conduits, wall, pipes, wires, poles, fences, property line markers and other items which the Engineer decides must be preserved in place without being temporarily or permanently relocated, shall be carefully supported and protected from damage by the Contractor. Should such items be damaged, they shall be restored by the Contractor to at least as good condition as that in which they were found immediately before the Work began.

B. Accommodation of Traffic

1. Streets and drives shall not be unnecessarily obstructed. The Contractor shall take such measures at his own expense to keep the street or road open and safe for two-way traffic unless otherwise indicated.
2. Access to the Train Station must be provided at all times.
3. Construct and maintain such adequate and proper bridges over excavations as may be necessary or as directed for the safe accommodation of pedestrians and vehicles. Provide substantial barricades at crossings of trenches, or along the trench to protect the traveling public.
4. Where deemed necessary, such additional passageways as may be directed shall be maintained free of such obstructions. All material piles, open excavations, equipment, and pipe which may serve as obstructions to traffic shall be protected by proper lights, signage, or guards as necessary.
5. All traffic controls shall be in accordance with the Manual on Uniform Traffic Control Devices for Streets and Highways, latest edition.

C. Erosion and Sedimentation Control

1. Take all necessary steps to prevent soil erosion.
2. Plan the sequence of construction so that only the smallest practical area of land is exposed at any one time during construction.
3. Temporary vegetation and/or mulching shall be used to protect critical areas exposed during construction as judged by the Engineer.

END OF SECTION

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SECTION 02317

UNDERGROUND WARNING TAPE

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Underground Warning Tape

1.2 SUBMITTALS

- 1. Product Data

PART 2 PRODUCTS

2.1 MATERIALS

- A. Metallic warning tape for underground piping shall be polyethylene tape with metallic core for easy detection and location of piping with a metal detector.
- B. Tape shall be 6 inches wide.
- C. Tape shall be as manufactured by Seton Name Plate Corp., New Haven, CT; Presco Detectable Underground Warning tape, Sherman, Texas; Blackburn Manufacturing, Neligh, NE; Mercotape, Hachensach, NJ; or equal.
- D. The warning tape shall be heavy gauge 0.004 inch polyethylene and shall be resistant to acids, alkalis and other soil components. It shall be highly visible in the following colors with the associated phrases stamped in black letters and repeated at a maximum interval of 40 inches.

Type of Utility	Color	Warning Message
Sanitary Sewer	Green	CAUTION - SANITARY SEWER BURIED BELOW
Sewer Force Main	Green	CAUTION - FORCE MAIN BURIED BELOW
Electric	Red	CAUTION - ELECTRIC LINE BURIED BELOW
Water	Blue	CAUTION - WATER LINE BURIED BELOW
Telephone / Communications	Orange	CAUTION - TELEPHONE LINE BURIED BELOW
Gas	Yellow	CAUTION - GAS LINE BURIED BELOW

- E. The tape shall be the type specifically manufactured for marking and locating utilities.

PART 3 EXECUTION

3.1 INSTALLATION

- A. All buried pipe and fittings shall be installed with metallic-lined underground warning tape located no more than 24 inches below final grade to allow detection by a metal detector.

END OF SECTION

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PART 1 GENERAL

1.1. SECTION INCLUDES

1.1.1. Requirements for restoring work and adjacent areas.

1.2. SYSTEM DESCRIPTION

1.2.1. Restoration shall be done as promptly as practicable to minimize inconvenience to the public and property owners and shall not be left until the end of the construction period.

1.2.2. Permanent restoration shall begin within 3 days after the backfilling or grading has been finished and be completed within 10 days unless extenuating circumstances exist which would delay such restoration and the delay has been approved by the owner or applicable regulatory agency. If the permanent restoration measures are delayed, temporary restoration measures shall be employed until the permanent restoration can be accomplished.

1.2.3. Restoration, unless otherwise shown on the drawings, shall consist of replacing or restoring to a condition equal to or better than original, all topsoil, lawns, shrubs, trees, fences, fields, curbs, sidewalks, driveways, parking lots, pavements, guide rail, incidental works or any and all other property removed or harmed in any way by reason of work done under this contract.

1.2.4. Restoration in critical impact areas shall conform to the requirements of all applicable permits, the regulations of the authorities having jurisdiction and the requirements herein.

1.2.5. Temporary restoration, unless otherwise shown on the drawings, shall consist of final grading of the restoration area, temporary soil stabilization with seed or mulch in accordance with the requirements herein.

1.2.5.1. When seeding work does not coincide with permanent seeding dates or where necessary, as determined by the engineer, disturbed areas shall be temporarily seeded or mulched until proper weather conditions exist for the establishment of a permanent vegetative cover.

1.2.5.2. Temporary seeding as a temporary stabilization measure shall consist of liming, fertilizing, and seeding at the following rates:

- a) Seed shall be annual rye grass spread uniformly at a rate of 1 lb. per 1,000 square feet.
- b) Fertilizer shall be applied at a rate of 14 lbs. per 1,000 square feet of 5-10-10 or its equivalent.
- c) Limestone (equivalent to 50 percent calcium plus magnesium oxides) shall be as follows:

SOIL TEXTURE	TONS/ ACRE	LBS./ 1,000 SQ. FT.
Clay, clay loams, and highly organic soils	3	135
Sandy loams, loams, and silt loams	2	90
Loamy sands, sands	1	45

1.2.5.3. Temporary restoration shall be employed as soon as it is determined that permanent restoration will not be employed but in no case later than 7 days after the trench backfilling or grading has been finished and shall be completed within 30 days. In no case, however, shall bare earth surfaces be allowed to remain exposed in excess of 7 days without the application of temporary restoration measures described herein.

1.2.5.4. When mulch alone is employed as a temporary restoration measure, as in cases where weather conditions prevent even temporary seeding, mulch materials shall be un-rotted salt hay, hay, or small grain straw applied at the rate of 1½ - 2 tons per acre, or 70 to 90 lbs. per 1,000 square feet and bound in place.

1.2.5.5. Mulch shall be employed only when all forms of seeding are impractical and shall be generally limited to the time between November and March when it is too cold to seed.

PART 2 PRODUCTS

2.1. MATERIALS

2.1.1. Materials for the restoration work shall conform to the applicable requirements contained elsewhere within these contract documents for similar work.

PART 3 EXECUTION

3.1. APPLICATION

- 3.1.1. Surfaces which have been damaged by the Contractor's operations shall be restored to the condition and the elevations equal to that in which they were found immediately prior to the beginning of operations or as otherwise indicated on the drawings. Suitable materials and methods shall be used for such restoration.
- 3.1.2. Prior to construction, the Contractor will carefully identify for inspection, by flagging, all trees and cultivated shrubs which shall be scheduled for transplanting. No tree or shrub shall be transplanted without prior inspection by the engineer or his representatives. No trees or shrubs shall be cut or removed without notification of the property owner unless specifically called for on the drawings.
- 3.1.3. The Contractor shall not be required to transplant trees of more than 3" caliper. Trees over this caliper shall be cut and removed. For any such trees cut and removed, the Contractor shall replace them with a tree of like or approved kind, of 2½" - 3" caliper, planted in a location as directed by the property owner but not more than 100 feet from the original tree's position.
- 3.1.4. The Contractor shall notify each property owner of the cultivated trees and shrubs scheduled for transplanting and shall transplant them at the Contractor's own expense as directed by and to the satisfaction of the property owner. However, in no case shall trees be replanted within 10 feet measured horizontally of the edge of a new pavement or new underground pipe line. The Contractor will not be required to transplant any shrub or tree over 100 feet away from its original location. Responsibility for successful transplanting rests with the Contractor, and all trees or shrubs that do not survive transplanting shall be replaced to the satisfaction of the owner by the Contractor at the Contractor's expense. However, no tree or shrub required for replacement shall be over 3" caliper.
- 3.1.5. In restoring the areas the Contractor shall, in general:
- a) Topsoil, with screened topsoil, all disturbed areas by placing a minimum of 4 to 6 inches of screened topsoil in accordance with Section "Topsoiling, Seeding and Mulching", Division 2.
 - b) Remove from the property and dispose of all trees, brush and other items that the Contractor has cut in order to perform his work.
 - c) Remove from the property upon completion of the work thereon all excess materials of construction such as stone, pipe, concrete block, gravel, etc., that the Contractor may have stockpiled for use during the course of the work.
 - d) Except where otherwise indicated, remove all temporary erosion control measures and deposited silt or other debris.

- e) Leave the land in a smooth, even condition. All ruts, holes or other undesirable grading conditions which resulted from work under this contract shall be filled and the area so graded to eliminate ponding and restored to preexisting drainage patterns. All drainage courses shall be restored to their preexisting condition or better.
- f) Fertilize and seed those areas where the original ground cover was removed or disturbed by operations under this contract in accordance with Section "Topsoiling, Seeding and Mulching", Division 2.
- g) The Contractor shall also repair, reset or replace all pipes, walls, utilities, fences, railings, stone walls, etc., and ornamental or utilitarian domestic accessories, not limited to arbors, fireplaces, sheds and incinerators, or other surfaces, structures, or property which may have been damaged, either directly or indirectly by his operations under this contract.
- h) Restore all curbs, sidewalks, driveways and pavements removed or damaged by operations under this contract.

3.1.6. In addition to the applicable restoration requirements above, the Contractor shall:

- a) After the excavation has been backfilled, prepare the right-of-way immediately (weather permitting) for restoration of vegetation. Erosion control measures shall be utilized immediately, and final restoration shall be undertaken as soon as an area is no longer needed for construction, stockpiles, or access. Excavated stones and boulders too large to be incorporated in backfilling shall be removed from the construction site. Excess soil within the right-of-way shall be graded or removed. When access roads are no longer needed, road fill shall be removed and the access area shall be restored to its preexisting condition. Care shall be taken to avoid damage to adjacent vegetation and to prevent the formation of depressions.
- b) When shown on the drawings in order to minimize the impact of construction and of the right-of-way, plant common native trees and shrubs in the cleared portions of the right-of-way. Numbers, sizes and types shall be shown.
- c) Lime, fertilize and seed all disturbed areas with the permanent seed mixtures in accordance with Section "Topsoiling, Seeding and Mulching", Division 2. Mulch seeded areas immediately after seeding. If permanent seeding is not practical, all disturbed areas shall be seeded with a temporary seed mixture and/or mulched immediately as a temporary stabilization measure until the permanent seeding and mulching can be accomplished.

**** END OF SECTION ****

SECTION 02513
BITUMINOUS PAVEMENT

PART 1 GENERAL

1.1. SECTION INCLUDES

1.1.1. Requirements for installing bituminous pavement.

1.2. SYSTEM DESCRIPTION

1.2.1. Bituminous pavement shall consist of bituminous base course, bituminous binder course, tack coat and bituminous top course, hot-mixed, placed on a thoroughly compacted and shaped gravel base course or subbase course or subgrade as shown on the drawings.

1.2.2. Thickness and type of bituminous pavement shall be as shown on the drawings or equal to the existing pavement and shall be satisfactory to the roadway's jurisdictional authority.

1.2.3. Type and thickness of the foundation course or subbase shall be as shown on the drawings.

1.3. REFERENCES

1.3.1. NYSDOT Standard Specifications.

1.4. SUBMITTALS

1.4.1. Certification of mix for each batch and polymer modified sealer shall be submitted to the Engineer. Certifications for mix designs shall be for the year that the project is being constructed.

PART 2 PRODUCTS

2.1. MATERIALS

2.1.1. Subbase course shall conform to the requirements of the Section "Unsuitable, Suitable and Select Materials," Division 2, unless otherwise shown on the drawings.

2.1.2. Bituminous base course (Type 1), NYSDOT Item No. 403.118902, shall conform to the requirements of Section 403 of the NYSDOT Standard Specifications.

2.1.3. Bituminous binder course (Type 3), NYSDOT Item No. 403.138902, shall conform to the requirements of section 403 of the NYSDOT Standard Specifications.

- 2.1.4. Bituminous top course (Type 6F2), NYSDOT Item No. 403.178202, shall conform to the requirements of Section 403 of the NYSDOT Standard Specifications.
- 2.1.5. Trueing and leveling course, NYSDOT Item No. 403.218902, shall conform to the requirements of Section 403 of the NYSDOT Standard Specification.
- 2.1.6. Tack coat shall conform to the requirements of Section 407 of the NYSDOT Standard Specifications.

PART 3 EXECUTION

3.1 TRENCH REPAIR

- 3.1.1. The temporary pavement placed upon completion of the trench backfill shall be removed and existing pavement and base shall be removed to the limits shown on the drawings. The top surface shall be saw cut to provide a straight, square edged surface against which the new surface course shall butt. All exposed edges of existing asphalt shall have tack coat applied prior to placement of new asphalt. All removed pavement materials shall be properly disposed of in accordance with the Section "Waste Materials Disposal", Division 1. Excavate to required subgrade elevation and prepare the subgrade for placement of the subbase or base course.

3.2 NEW CONSTRUCTION

- 3.2.1. Excavation, grading and preparation of the subgrade shall be in accordance with requirements of the applicable Division 2 sections.
- 3.2.2. Subbase shall be installed in accordance with requirements of the applicable Division 2 sections.
- 3.2.3. Bituminous base course shall be installed in accordance with the NYSDOT Standard Specifications and as shown on the drawings.
- 3.2.4. Bituminous binder course shall be installed in accordance with the NYSDOT Standard Specifications, and as shown on the Contract Drawings.
- 3.2.5. Binder course may not be placed until satisfactory results of the initial compactive effort testing have been obtained as specified in the Section "Trenching, backfilling and Compaction," Division 2, and as shown on the drawings.
- 3.2.6. Bituminous top course and tack coat shall be installed in accordance with the requirements of the NYSDOT Standard Specifications and where requested by Engineer. Tie-in of new top course to existing paved roadways shall be by means of a milled 1 1/2" deep by 2 foot wide key-way. Key-way shall be cleaned and tack coated prior to pavement application.

- 3.2.7. Upon completion of paving, all tie-in joints shall be sealed with a polymer modified sealer. This includes all tie-in joints located within driveways.
- 3.2.8. Pavement shall be laid at the required temperatures set forth in the NYSDOT Standard Specifications. **Any material found to be below the required temperature shall be immediately rejected at the Contractor's expense.** Rejection of pavement due to low temperature does not entitle Contractor to an extension of time or claims for delays or damages.

3.2.9. All transverse joints shall be staggered a minimum of 3 feet between courses.

3.3. TRUEING AND LEVELING FOR EXISTING ROADWAYS TO BE OVERLAID

- 3.3.1. Contractor shall thoroughly sweep and clean roadway and apply tack coat prior to placement of the trueing and leveling course.
- 3.3.2. Trueing and leveling course shall be New York State Department of Transportation Type 5 where course is greater than $\frac{1}{4}$ " and less than $\frac{3}{4}$ ".
- 3.3.3. Trueing and leveling course shall be New York State Department of Transportation Type 6F2 where course is greater than $\frac{3}{4}$ " and less than 2".
- 3.3.4. Trueing and leveling course shall be New York State Department of Transportation - Type 3 Binder where course is thicker than 2".
- 3.3.5. All trueing and leveling courses shall be placed, thoroughly compacted and rolled in accordance with the current New York State Department of Transportation Standard Specifications.

3.4. WEATHER AND SEASONAL LIMITATIONS

- 3.4.1. Bituminous plant mix shall not be placed on any wet surfaces or when weather conditions otherwise prevent the proper handling or finishing of the bituminous mixtures as determined by the Engineer.
- 3.4.2. Paving courses shall be placed within the following temperature and seasonal limitations:

Nominal Compacted Lift Thickness	Surface Temperature Minimum (Note 1 & 4)	Seasonal Limits
4" or greater	40°F	None
Greater than 2" but less than 4"	45°F	Note 2
2" or less	50°F	Note 2

NOTES:

1. All temperatures shall be measured on the surface where the paving is to be placed, and the controlling temperature shall be the average of three temperature reading taken at locations 25± feet apart in accordance with the NYSDOT Specification.
2. Top course shall be placed only during the period of April 1st up to and including the third Saturday in November.
- 3.4.3. Paving operations shall be scheduled such that all paving necessary to provide safe and adequate maintenance and protection of traffic, or for protection of previously laid courses is completed within the weather and seasonal limitations.
- 3.4.4. All additional costs, including but not limited to, expediting construction, limiting length of work, shimming castings and protrusions, drainage, providing acceptable rideability, and all temporary work required due to failure to complete work within the weather or seasonable limitation shall be at no additional cost to the Owner. In addition, any binder course which will be permanently incorporated into the work, left open to traffic over the winter shall be cleaned and tack coated immediately prior to overlaying at no additional cost to the Owner.
- 3.4.5. Waivers to the seasonal limitations shall be submitted by the Contractor, in writing, to the Engineer for approval.

PART 4 MEASUREMENT AND PAYMENT

4.1. MEASUREMENT

- 4.1.1. Measurement of sub-base course is by the square yard in accordance with the payment widths and compacted thicknesses as shown on the drawings without deduction of areas occupied by manholes and similar structures within the pavement area.
- 4.1.2. Measurement of bituminous base course is by the square yard in accordance with the payment widths and compacted thicknesses as shown on the drawings without deduction of areas occupied by manholes and similar structures within the pavement area.
- 4.1.3. Measurement of bituminous binder course is by the square yard in accordance with the payment widths and compacted thicknesses as shown on the drawings without deduction of areas occupied by manholes and similar structures within the pavement area.

4.1.4. Measurement of bituminous top course is by the square yard in accordance with the payment widths and compacted thicknesses as shown on the drawings without deduction of areas occupied by manholes and similar structures within the pavement area.

4.1.5. Measurement of bituminous base course, binder course, shim course, and top course used for trueing and leveling is by the ton without the deduction of areas occupied by manholes and similar structures within the pavement area.

4.2. PAYMENT

4.2.1. The unit price for sub-base course is described in Part 4 of the Section "Unsuitable, Suitable and Select Materials," Division 2, and includes excavating to the required subgrade elevation; preparing the subgrade; furnishing, placing and compacting the foundation material; and all else incidental and necessary to complete the work.

4.2.2. The unit price for bituminous base course includes removal and disposal of temporary roadway surfaces; saw cutting; removal and disposal of the existing pavement or base course to the limits shown on the drawings; excavation to the required subbase elevation; preparation of the subbase; furnishing, placing and compacting the base course material; and all else incidental and necessary to complete the work.

4.2.3. The unit price for bituminous binder course includes removal and disposal of temporary roadway surfaces; saw cutting; removal and disposal of the existing pavement or base course to the limits shown on the drawings; excavation to the required subbase elevation; preparation of the subbase; furnishing, placing and compacting the base course material; and all else incidental and necessary to complete the work.

4.2.4. The unit price for bituminous top course includes furnishing, placing and compacting the surface course material; paved berms; furnishing and applying the tack coat; cutting of key-ways; sealing of all joints with polymer modified sealer; the raising of utility castings and valve boxes; the restoration or leveling courses required to maintain grades in roadways, driveways, parking lots and other paved areas, and all else incidental and necessary to complete the work.

4.2.5. The unit price for bituminous base course, binder course, shim course and top course used for trueing and leveling includes removal of temporary roadway surfaces, saw cutting, removal and disposal of existing damaged pavement or base course and furnishing and applying tack coat.

**** END OF SECTION ****

SECTION 02514

DUCTILE IRON PIPE AND FITTINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Ductile iron pipe and fittings, direct buried or in below grade vaults
2. Restrained joints and fittings

B. Related Sections

1. Section 02315 – Excavation, Backfill, Compaction and Dewatering
2. Section 09900 – Painting

1.2 REFERENCES

A. Pipe and fittings shall conform to the latest edition of the following standards unless otherwise specified:

1. ANSI/AWWA C104/A21.4, Cement Mortar Lining for Ductile Iron Pipe and Fittings for Water.
2. ANSI/AWWA C110/A21.10, Ductile Iron and Grey Iron Fittings 3" through 48" for Water and Other Liquids.
3. ANSI/AWWA C111/A21.11, Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings.
4. ANSI/AWWA C115/A21.15, Flanged Ductile Iron Pipe with Ductile Iron or Gray-Iron Threaded Flanges.
5. ANSI/AWWA C116/A21.16, Protective Fusion-Bonded Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings.
6. ANSI/AWWA C150/A21.50, Thickness Design of Ductile Iron Pipe.
7. ANSI/AWWA C151/A21.51, Ductile Iron Pipe, Centrifugally Cast, for Water.
8. ANSI/AWWA-C153/A21.53, Ductile Iron Compact Fittings Water Service.
9. ANSI/AWWA C600, Installation of Ductile Iron Water Mains and their Appurtenances.
10. ANSI/AWWA C800, Underground Service Line Valves and Fittings.
11. ANSI/AWWA C651, Disinfecting Water Mains.
12. ASTM A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
13. ASTM A536, Standard Specification for Ductile Iron Castings
14. ASTM B88, Standard Specification for Seamless Copper Water Tube.

15. Ductile Iron Pipe Research Association, "Thrust Restraint Design for Ductile Iron Pipe" (Current Edition).

1.3 SUBMITTALS

A. Administrative Submittals

1. Detailed description of proposed pipe handling and installation methods along with the manufacturer's approval of those methods.
2. Construction details and schedule of Work for each connection to existing piping at least 7 days prior to beginning the Work. Approval must be received before commencement of Work on-site.

B. Shop Drawings

1. Manufacturer's drawings and catalog cuts, including descriptive literature indicating product characteristics and conformance with specifications and code requirements. Submit shop drawings for ductile iron pipe; fittings; couplings; filling rings; linings and coatings; and all accessories.
2. Location for each type of restrained joint or device to prevent joint separation along with installation, assembly and disassembly instructions.

C. Quality Control Submittals

1. Certificates of compliance on pipe materials.
2. Prior to first shipment of pipe, submit certified test reports that the pipe for this Contract was manufactured and tested in accordance with the ASTM and ANSI/AWWA Standards specified herein.
3. Manufacturer of pipe and Manufacturer of fittings on the project shall have an established, annually audited and certified, quality control procedure for manufacturing of pipe and manufacturing of fittings respectively. Manufacturer shall be certified by an independent, third party auditor for compliance with all requirements of the AWWA standards. The manufacturer shall submit a current certificate of compliance for the plant facility where the pipe or fittings are to be made. Certificate of compliance shall be submitted for each additional year of manufacturing during the duration of the Project. The manufacturer shall not change the plant manufacturing the pipe or fittings during the duration of the Work.

1.4 QUALITY ASSURANCE

- A. Pipe and fittings shall be inspected at the foundry as required by the standard specifications to which the material is manufactured. In addition, the Owner reserves the right to have any or all pipe, fittings, and special castings inspected and/or tested by an independent service, or by the Engineer, at either the manufacturer's plant or other testing laboratory at their own expense.
- B. Ductile iron pipe shall be from a single manufacturer. Fittings shall be from a single manufacturer, not necessarily the pipe manufacturer.
- C. The Engineer will inspect the pipe and fittings after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the Specification

requirements. Pipe rejected after delivery, or at any point during the progress of the Work, shall be marked for identification and shall immediately be removed from the job site and replaced at no additional cost to the Owner.

- D. Test pipe under pressure for defects and leakage in accordance with applicable specification section.

1.5 PROJECT CONDITIONS

- A. Secure permits and pay fees required to carry out the piping work. Comply with laws, ordinances, codes, rules, and regulations of the local and state authorities having jurisdiction over the Work. Where provisions of the Contract Documents are in conflict with the codes, the more stringent shall govern.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. American Cast Iron Pipe Company
- B. U.S. Pipe
- C. McWane Ductile
- D. or equal

2.2 PIPE AND FITTINGS - GENERAL

- A. Ductile iron pipe shall be designed in accordance with AWWA C150 and shall be manufactured in accordance with AWWA C151. Fittings and other materials referenced in this section shall conform to the latest edition of the references listed in Paragraph 1.2 of this section.
- B. Unless otherwise indicated or specified in the Contract Documents, buried ductile iron pipe and fittings shall be Class 52 with push on joints.
- C. Unless otherwise indicated or specified, buried pipe shall have an asphaltic exterior coating in accordance with AWWA C110, C151 or C153, as applicable.
- D. Unless otherwise indicated or specified in the Contract Documents, buried fittings shall be ductile iron or gray iron with mechanical joints.
- E. Unless otherwise indicated or specified in the Contract Documents, ductile iron pipe and fittings installed above ground and/or in buried wet wells/vaults, shall be Class 53 with flanged joints.
- F. Exposed piping shall be shop primed and painted in the field in accordance with Section 09900. Exposed piping to be painted shall not have an asphaltic exterior coating applied.
- G. Pipe and fittings shall be cement mortar lined and seal coated on the interior in accordance with AWWA C104. Cement mortar lining shall be twice the standard thickness; tolerance shall be minus 0 inches, plus 1/8 inch.
- H. Epoxy Lining

1. All ductile iron pipe and fittings shall be lined with Protecto 401™ ceramic epoxy lining, Tnemec Perma-or approved equal.
2. Lining shall be amine cured novolac epoxy, lined on the interior, containing at least 20% by volume of ceramic quartz pigment.
3. Epoxy lining shall be factory applied utilizing specialized equipment as recommended by the epoxy manufacturer. Lining shall be at a nominal 40 mils minimum thickness.
4. No repair of field damaged epoxy lining shall be permitted. Any pipe segments with defects in epoxy lining shall be replaced at no cost to the owner.

2.3 PIPE AND FITTING JOINTS

- A. Push-on-joints and mechanical joints shall conform to ANSI/AWWA C111/A21.11.
- B. Flanged joints shall be assembled with bolts and nuts, bolt studs with nut on each end, or studs with nuts in tapped flanges. Bolts and nuts shall be manufactured in accordance with ASTM A325, Type 1, Grade 5, hot-dipped galvanized finish, heavy hex head, 120,000 psi minimum tensile strength with X-Heavy nuts. Nuts and bolts shall be provided with an anti-seize, thread lubricating compound.
- C. Gaskets for flanged joints shall be full face, 1/8 inch red rubber. Ring gaskets shall be provided for piping 14 inches in diameter and larger.
- D. Where indicated on the Drawings, provide restrained joints. Gaskets shall meet the material requirements of ANSI/AWWA A21.11/C111 for mechanical joint gaskets.
- E. Restrained gasketed joints for rubber push-on joint pipe shall be Fast-Grip® by American Cast Iron Pipe Company, Field Lok 350® by US Pipe and Foundry Co., or equal. Contractor is to supply the Owner with four new gasket disassembly drive shims as a part of the project.

2.4 FITTINGS

- A. Fittings shall be ductile iron or gray iron.
- B. Fittings less than or equal to 12 inches in size shall conform to ANSI/AWWA C110/A21.10 or ANSI/AWWA C153/A21.53 and shall have a 350 psi pressure rating.
- C. Fittings greater than 12 inches in size shall conform to ANSI/AWWA C110/A21.10 or ANSI/AWWA C153/A21.53 and shall have the following pressure ratings:
 1. Fittings greater than 12 inches and less than or equal to 24 inches - 350 psi
 2. Fittings greater than 24 inches - 250 psi
- D. Mechanical joint retainer glands shall be installed on all mechanical joints. Retainer glands shall be specifically designed to fit standard mechanical joint bells with corrosion resistant, high strength, low-alloy T-head bolts conforming to ANSI/AWWA A21.11/C-111 and ANSI/AWWA A21.53/C-153. Retainer glands shall be manufactured of ductile iron conforming to ASTM A536-80, grade 60-42-10. Wedges shall be of hardened ductile iron and require the same torque in all sizes. These devices shall have a minimum 250 psi pressure rating with a minimum safety

factor of 2:1 and shall be EBAA IRON, Inc., Megalug® series 1100 or equal. Glands shall be listed with Underwriters Laboratories and/or approved by Factory Mutual.

- E. All fittings shall have interior epoxy coating matching the mainline pipe.

2.5 COUPLINGS

- A. Solid sleeves shall have long body type (12 inches min.) and mechanical joints with retainer glands.
- B. Couplings and transitional couplings for pipe less than or equal to 12 inches in diameter shall consist of a long body cast iron sleeve and shall have gaskets suitable for the pipe being joined. The bolts and nuts shall be corrosion resistant high strength, low alloy steel such as Cor-Ten steel or an approved equal. Couplings shall be Romac style 501, Dresser style 153, Rockwell type 441, or equal. Transition couplings for pipe less than or equal to 12 inches in diameter shall be Dresser Style 162, Rockwell Type 441, Smith Blair Omni Style 442, or equal.
- C. Couplings and transitional couplings for pipe greater than 12 inches in diameter shall consist of a steel sleeve with gaskets suitable for the pipe being joined. The bolts and nuts shall be corrosion resistant high strength, low alloy steel such as Cor-Ten steel or an approved equal. Couplings shall be Dresser Style 38, Smith Blair Style 311, Romac Style 400, or equal. Transition couplings for pipe greater than 12 inches in diameter shall be Dresser Style 62, Smith Blair Style 413, Romac Style TC400, or equal.
- D. Provide couplings with an exterior epoxy coating.

2.6 GASKETS, GLANDS, NUTS, AND BOLTS

- A. Gaskets, glands, nuts, bolts and accessories shall conform to ANSI/AWWA C111/A21.11 or C153/A21.53, as appropriate.
- B. Gaskets shall be of plain tipped rubber, suitable for exposure to the liquid within the pipe.
- C. Lubricants must be suitable for the type of fluid to be carried by the pipeline, and shall be NSF approved for water service.
- D. Glands shall be ductile or cast iron.
- E. Bolts shall be high strength, low alloy.
- F. Requirements for flanged joints:
 - 1. Gaskets for flanged joints shall be full faced red rubber, 1/8 inches thick. Gaskets shall conform to the dimensions of Table A.1 of ANSI/AWWA C115/A21.15. Ring gaskets shall be utilized for joints 14 inches in diameter and larger.
 - 2. Assemble flanged joints with bolts and nuts, bolt studs with nut on each end, or studs with nuts in tapped flanges. Bolts and nuts shall be of low carbon steel conforming to the chemical and mechanical requirements of ASTM A307, 60,000 psi tensile strength, Grade B. Bolts, nuts and studs shall be cadmium plated.

2.7 THRUST BLOCKS AND ANCHOR BLOCKS

- A. Concrete shall have a 28-day compressive strength of 3,000 psi.

2.8 TEST CONNECTIONS

- A. Install air release, test connections, and blow offs in the piping for pressure testing and disinfection at locations to be determined by the Contractor and approved by the Engineer.
 - 1. Corporation cocks shall be in accordance with ANSI/AWWA C800 and shall be ¾ inch diameter with CC thread on inlet by iron pipe thread flare on outlet as manufactured by Mueller, Ford, McDonald or equal.
 - 2. Copper tubing shall be annealed Type K soft tubing and shall conform to the requirements of ASTM B88.
 - 3. Upon completion of testing and disinfection, remove the corporation cock and replace with a brass plug and the copper tubing removed. Field swab the brass plug for disinfection in accordance with AWWA C651.

PART 3 EXECUTION

3.1 GENERAL

- A. Deliver, handle, store and install ductile iron pipe in accordance with ANSI/AWWA C600.

3.2 DELIVERY, STORAGE AND HANDLING

- A. Delivery of Pipe and Fittings
 - 1. Coordinate delivery of pipe and fittings with installation and unload along the line of work outside the trench near as practicable to the point of final placement, and properly wedged secure. Give minimum 24 hour notice to the Engineer prior to pipe deliveries. Notice shall include the method of unloading.
 - 2. Unload and handle pipe and fittings with a crane or backhoe of proper capacity outfitted with a steel cable sling, belt sling or other specially designed attachment to protect the pipe coating.
 - 3. At the end of each work week, no more than the amount of pipe to be installed the following work week shall remain along the construction route. All pipes remaining along the construction route are to be properly wedged to prevent movement and not interfere with traffic or pedestrian movement. All excess pipes are to be stockpiled at an approved staging yard in accordance with AWWA C600.
- B. Storage of Materials
 - 1. Store pipe in a manner to keep pipe interior free from dirt and foreign matter. Store pipe on wood blocking, rails or other suitable materials. Pipe shall not be stored on stones.
 - 2. Pipe may be stored on top of each other to the maximum stacking height specified by AWWA C600.

3. Protect materials subject to corrosion in accordance with manufacturer's recommendations.
4. If pipe or project materials are stored at the Contractor's approved staging yard, the Engineer shall be permitted reasonable access to the staging yard for inspection of the pipe and materials.
5. Pipe ends shall be sealed tight using polyethylene bags and tape immediately after unloading, regardless of the storage time length, in order to keep foreign matter and wind-blown debris out.
6. All fittings are to be stored off of the ground on wooden pallets.

C. Handling Materials

1. Handle materials in such a manner so as to prevent damage to the concrete or mortar coating or lining.
2. Materials are to be handled using methods approved by the pipe manufacturer.
3. Materials damaged during handling will be rejected and shall be replaced at the Contractor's expense.
4. Ensure that no foreign materials enter the pipe and fittings during handling.

3.3 COORDINATION

- A. Existing mains may have to be shut down to complete the connections, as shown on the Drawings and as specified herein.
1. Existing valves will only be operated by the Owner.
 2. Submit requests for shutdown of existing piping to the Engineer at least 5 working days prior to the operations and reschedule operations to prevent conflicts with the Owner's operations.
 3. The Owner reserves the right to cancel the shut-down at any time without penalty if system conditions exist in which it would be a matter of public health or safety to do so.
 4. The Owner does not guarantee complete shut down of valves. Make necessary provisions to do work under existing conditions.

3.4 DEFECTIVE PIPE

- A. Defective pipe or fittings will be rejected for use on this project. Defective pipe is classified as follows:
1. Damage to interior lining
 2. Insufficient lining thickness
 3. Pipe out of round
 4. Damaged pipe barrel area
 5. Damaged pipe bells or spigots
 6. Missing, misplaced or illegible marking and identification
 7. Outside pipe diameter exceeding allowable tolerance
- B. If defective pipe is discovered after it has been installed, it shall be removed and replace with sound pipe, at no additional cost to the Owner.

3.5 JOB CONDITIONS

- A. Environmental Requirements
1. Do not lay pipe when weather conditions are unsuitable, as determined by the Engineer, for pipe laying work.

2. Equipment for pipe laying shall be maintained in good operating order.
3. Job site shall be kept clean of debris and organized.

B. Protection

1. At all times when pipe laying is not in progress, the open ends of pipe shall be closed by a watertight plug. This provision shall apply at all times when pipe laying operations are suspended.

C. Work Affecting Existing Pipelines

1. Work on Existing Pipelines:
 - a. Prior to any work on existing pipelines, remove soils, rust and other debris from the exterior wall of the pipe a minimum of 12 inches beyond the work area.
 - b. Cut pipes as shown or required with machines specifically designed for this work.
 - c. Install temporary plugs to keep out all mud, dirt, water and debris.
 - d. Provide necessary adapters, fittings, pipe and appurtenances required.
 - e. Cut or tap existing mains at the mid span of a pipe barrel. In no case shall a pipe be cut or tapped within 24 inches of a pipe joint.

3.6 CLEANING PIPE AND FITTINGS

- A. Clean and remove foreign matter from the interior of each pipe and fitting before placing in the trench. Remove pipe and fittings whose interior has been contaminated with oil, gasoline or kerosene and replace at no additional cost to the Owner. Remove pipe and fittings whose interior has been contaminated with any material which is a regulated drinking water contaminate or which damages the cement and replace at no additional cost to the Owner. Should foreign material or contaminants be observed in previously installed pipe, cease work until foreign material or contaminated pipe is decontaminated or removed.
- B. Remove all lumps, blisters, and excess asphaltic coating from the bell and spigot ends of each pipe or fitting. The outside of the spigot and the inside of the bell shall be wire-brushed and wiped clean and be dry and free from oil and grease before the pipe or fitting is laid.
- C. On all ductile iron pipe or fittings, the bell of the pipe and the spigot of the adjacent pipe or fitting shall be wire-brushed and cleaned of rust and dirt. The bell of the pipe or fitting and the spigot of the adjacent pipe shall then be lubricated with the joint lubricant furnished with the pipe and used in accordance with the manufacturer's directions.

3.7 ALIGNMENT AND GRADE

- A. Lay and maintain the pipe at the required lines and grades as shown on the Drawings. Fittings shall be at the locations indicated on the Drawings with joints centered, and spigots properly fitted. No deviation shall be made from the line and grade indicated on the Drawings, except with the approval of the Engineer.

B. Joint Openings and Deflection:

1. The maximum allowable joint openings and deflection for push-on joint pipe and restrained joint pipe shall be one-half the manufacturer's maximum allowable opening and deflection.
2. Radius curves indicated on the Drawings or approved during Shop Drawing review shall be made using full lengths of pipe. The use of short lengths of pipe and extra joints in order to make a smaller radius turn will not be allowed without the written approval of the Engineer.

C. Line or Grade Conflicts with Other Structures

1. Wherever obstructions not shown on the Drawings are encountered during the progress of the Work and interfere to such an extent that an alteration in the pipe layout is required, the Engineer will order a deviation from the line and grade at locations where obstructions such as culverts, ducts, wire and/or pipes are encountered. The pipe shall be laid over or under such obstacles with a minimum clearance of 6 inches. The Engineer reserves the right to make the decision to go over or under obstructions during construction.

D. Where underground conditions indicate a change of alignment or grade, such change shall be made only with the written consent of the Engineer.**E. Except at locations indicated on the Drawings by the profile, do not establish high points where air can accumulate.****3.8 PIPE INSTALLATION****A. General Requirements**

1. Prepare the pipe trench in accordance with Section 02315.
2. Keep trenches dewatered while installing pipe until all required pipe joints have been made and the trench has been backfilled above the water table to a point where pipe uplift will not occur when the pipe is empty.
3. Carefully lower pipe and fittings into the trench piece by piece by means of a crane, ropes or other tools or equipment, in such a manner as to prevent damage to pipeline materials and protective coatings and linings. Under no circumstances shall pipeline materials be dropped or dumped into the trench.
4. Carefully inspect pipe and fittings for cleanliness and defects prior to placing them in the trench.

B. Laying Pipe

1. Install pipe with a minimum of 5 feet of cover, unless indicated otherwise on the Drawings or directed by the Engineer.
2. Prevent foreign material from entering the pipe while it is being placed in the line. During laying operations, no debris, tools, clothing or other materials shall be placed in the pipe.
3. When laying pipe, the spigot end shall be centered in the bell, the pipe forced home and the joint completely assembled. The pipe shall be adjusted to correct

line and grade and secured in place with approved backfill material, properly tamped under and around the pipeline.

C. Cutting Pipe

1. Furnish pipe in full lengths. Cut ductile iron pipe without damage to the pipe or cement lining. The cutting shall be done to leave a smooth end at right angles to the axis of the pipe.
2. Cut ductile iron pipe either by the use of compression-type chain cutters which exert an even continuous force on the wall of the pipe or by power driven abrasive wheels.
3. On ductile iron pipe using rubber joints, the outside edge of the cut end must be tapered back approximately ¼ inch at an angle of about 30 degrees so as to provide for the proper assembly of this joint.

3.9 PUSH-ON JOINTS

- A. Push-on joints shall be made in accordance with the manufacturer's instructions. Install gaskets in the pipe bell after lowering the pipe into the trench for installation. Thoroughly clean the bell and spigot of dirt and tar blisters in the trench utilizing a wire brush or bristle brush. Insert rubber gasket in the groove of the bell end of the pipe beginning at the bottom of the bell and working to the top of the bell. Apply lubricant per the manufacturer's recommendations utilizing a paint brush to the pipe gasket and the pipe spigot to be joined. Place a clean rag under the joint to protect the joint from dirt caused by unintentional grounding of the pipe during jointing. Upon completion, remove the rag. Align the plain end of the pipe to be laid and insert in the bell of the pipe to which it is to be joined and push home with a jack or by other means. After joining the pipe use a metal feeler to make certain that the rubber gasket is correctly located.

3.10 MECHANICAL JOINTS

- A. Mechanical joints shall be made in accordance with Appendix A of ANSI A21.11/AWWA C111 and the manufacturer's instructions. Thoroughly clean and lubricate the joint surfaces and rubber gasket before assembly. Tighten bolts to the specified torques. Under no conditions shall extension wrenches or an extended handle ratchet wrench be used to secure greater leverage.

3.11 RESTRAINED JOINTS

- A. Install restrained joint pipe where indicated on the Drawings. Make the joint assemblies in accordance with the manufacturer's recommendations.
- B. Restrained joints are to be used in conjunction with concrete thrust blocks for restraining DI pipe. Required lengths of restrained joints are shown on the Drawings.

3.12 TESTING

- A. Pipe, fittings and valves installed under this contract shall be tested before being placed into service.

END OF SECTION

SECTION 02521
CONCRETE SIDEWALKS

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for installing concrete sidewalks.

1.2. SYSTEM DESCRIPTION

- 1.2.1. Sidewalks shall consist of Portland cement concrete constructed on a thoroughly compacted subgrade and shall be of the strength and to the dimensions as shown on the drawings and/or specified herein.

- 1.2.2. As a minimum, the dimensions shall conform to existing sidewalks, unless otherwise specified.

1.3. QUALITY ASSURANCE

- 1.3.1. The finished sidewalk shall be homogeneous, neat and workmanlike in appearance, and shall be of the required strength. All work with chips, scratches, or cracks (including hair line cracks) shall be removed and replaced at contractor's expense.
- 1.3.2. Completed sidewalks shall show no visible defects which require re-finishing.
- 1.3.3. Completed sidewalk shall not be subject to vehicular and/or pedestrian traffic until the work has gained sufficient strength to preclude damage.
- 1.3.4. Contractor shall ensure all exposed concrete surfaces are properly sealed to protect against de-icing agents. Any sidewalk shown to be scaling during warranty period shall be replaced at Contractor's cost.

1.4. SUBMITTALS

- 1.4.1. Shop drawings shall be submitted by the Contractor in accordance with the provisions of the Section "Shop Drawings and Samples," Division 1.

PART 2 PRODUCTS

2.1. MATERIALS

- 2.1.1. Preformed bituminous cellular type expansion joint fillers shall conform to the requirements of AASHTO M-213.

- 2.1.2. The concrete curing and sealing compound for concrete sidewalks shall be CERTI-VEX GUARD CLEAR AIM as manufactured by Vexcon. Curing and sealing compound shall be delivered to site in un-opened manufactures containers to verify product.
- 2.1.3. Forms shall be metal, wood or other suitable material and shall be straight, free from warp, clean and oiled.
- 2.1.4. Detectable warning fields shall be a cast in place system such as Armor Tile Tactile System, as manufactured by Armor Tile, or Step-Safe, as manufactured by TRANSPRO Industries, or approved equal. Detectable warning fields shall be brick red in color, and shall be installed in accordance with manufactures specifications and guidelines.

2.2. MIXES

- 2.2.1. Concrete mix shall be an air entrained Portland cement having a minimum 28-day strength of 4,000 psi. Concrete shall be fiber reinforced using Stealth e3 micro-reinforcement as manufactured by SI Concrete Systems.

PART 3 EXECUTION

3.1. PREPARATION

- 3.1.1. The subgrade for the sidewalk shall be compacted by suitable means to a density equal to that described in the Section "Soil Compaction", Division 2.

3.2. INSTALLATION

- 3.2.1. Prior to setting of forms, and after setting of string lines, the Contractor, Construction Observer and/or Engineer shall review the string lines to ensure that the proper grades are being achieved, and that the curb line is straight and un-wavy horizontally and vertically.
- 3.2.2. The concrete for sidewalks shall be tamped, screened and finished to true grade and surface. The finish shall be made with a wood float, followed by brushing transversely to the curb line with a wet soft hairbrush to a neat and workmanlike surface.
- 3.2.3. In sidewalks, transverse expansion joints of the preformed cellular type, 3/16" thick, shall be installed at street corners following the projections of the building lines from the corner of the building through the sidewalk to the curb or grassed area, and at intervals of 10' maximum spacing. Expansion material shall also be placed in line with all utility poles within the sidewalk, and around the utility pole.

- 3.2.4. In sidewalks, expansion joints of the preformed cellular type, 3/16" thick, shall be installed longitudinally between sidewalks and curbs; and longitudinally between sidewalks and permanent structures with the top 1/2" below the top of the sidewalk of which a 1/2" void shall be filled with a joint sealer. Expansion material shall also be placed around all structures within the sidewalk.
- 3.2.5. In sidewalks, transverse contraction joints 1" deep and 1/4" wide shall be cut by means of a suitable tool between transverse expansion joints at intervals equal to the sidewalk width.
- 3.2.6. Sidewalk joints shall be neatly rounded to a 1/4" radius.
- 3.2.7. Sidewalks shall be cured where the concrete has been finished. In sidewalks, cotton mats, burlap bags or straw, maintained wet, of the adequate size and/or thickness, and kept in place for not less than 72 hours, can be substituted for liquid curing with the approval of the Engineer.
- 3.2.8. During the curing process, suitable signs warning workmen and the general public shall be erected and maintained by the Contractor, as well as means of bridging the newly installed sidewalks. Foot traffic shall be restricted for at least 24 hours.
- 3.2.9. Sidewalks shall be sloped to depressed curbs at intersections to facilitate access by the handicapped. Grooves, 1/2" in depth, shall be placed parallel to the curb along the ramp at 1 1/2" intervals.
- 3.2.10. All driveway aprons and handicap ramps shall be a minimum of 6" thick and shall be reinforced with fiber mesh. Detectable warning fields shall be placed at all handicap ramps, and shall be installed in accordance with manufactures specifications and guidelines.
- 3.2.11. All sidewalks shall be a minimum of 4" thick and shall be reinforced with fiber mesh.
- 3.2.12. Sidewalks shall be sealed with the specified sealer after seven days. The sidewalk shall be clean and dry before sealing. Foot traffic shall be restricted for at least two hours after sealing. Sealing manufacturer's guidelines for application should be followed. Sidewalks shall receive at least 2 coats of sealer.

3.3. FIELD QUALITY CONTROL

- 3.3.1. Concrete samples and testing shall be done as specified in Section 03300 "Cast-in-Place Concrete". If concrete is not sampled and tested, it shall be removed and replaced at Contractor's expense.

PART 4 MEASUREMENT AND PAYMENT

4.1. MEASUREMENT

- 4.1.1. Measurement for concrete sidewalk, driveway aprons, and handicap ramps is by the square foot actually constructed.

4.2. PAYMENT

- 4.2.1. Unit price concrete sidewalk includes excavation outside the pay limits of other items, preparation of the subgrade, supplying and installation of subbase material, compaction, construction of the sidewalk, handicap ramps, expansion joints, backfilling, joint sealer, detectable warning fields, finishing, curing, cleaning up, sealing, reinforcing and all else incidental and necessary to complete the work.
- 4.2.2. Payment for concrete driveways, aprons, and handicap ramps shall be made under the unit price for concrete sidewalks.

** END OF SECTION **

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for installing concrete curbs.

1.2. SYSTEM DESCRIPTION

- 1.2.1. Curbing shall consist of Portland cement concrete constructed to the dimensions as shown on the drawings.
- 1.2.2. Curbs shall be constructed in coordination with pavement removal and replacement.

1.3. QUALITY ASSURANCE

- 1.3.1. The finished work shall be homogeneous, neat and workmanlike in appearance, and shall be of the required strength. All work with chips, spalling, scratches, or cracks (including hair line cracks) shall be removed and replaced at contractor's expense.
- 1.3.2. Curbs shall not vary from the prescribed line and grade more than 1/4 inch at any point, unless directed otherwise by the engineer.
- 1.3.3. Completed work shall show no visible defects which require re-finishing.
- 1.3.4. Completed curb shall not be subject to vehicular and/or pedestrian traffic until the work has gained sufficient strength to preclude damage.

PART 2 PRODUCTS

2.1. MATERIALS

- 2.1.1. Preformed bituminous cellular type expansion joint fillers shall conform to the requirements of AASHTO M-33.
- 2.1.2. The concrete curing and sealing compound for monolithic curb and sidewalk shall be CERTI-VEX GUARD CLEAR AIM as manufactured by Vexcon. Curing and sealing compound shall be delivered to site in un-opened manufacturers containers to verify product.

- 2.1.3. Forms shall be metal, wood or other suitable material and shall be straight, free from warp, clean and oiled.

2.2. MIXES

- 2.2.1. Concrete mix shall be an air entrained Portland cement having a minimum 28-day strength of 4000 and shall be in accordance with the appropriate Sections of Division 3. Concrete shall be reinforced with Stealth e3 micro-reinforcement fiber mesh as manufactured by SI Concrete Systems.

PART 3 EXECUTION

3.1. PREPARATION

- 3.1.1. Excavation including the removal of existing curbs, pavement or sidewalks shall be to the depth and width necessary to install the new curb or as shown on the drawings. All soft or yielding material shall be removed and replaced with suitable material.
- 3.1.2. Base material to the thickness shown on the drawings, shall be Manufactured Item 4, conforming to the provisions of Section "Unsuitable, Suitable and Select Material," Division 2.

3.2. INSTALLATION

- 3.2.1. Prior to setting of forms, and after setting of string lines, the Contractor, Construction Observer and/or Engineer shall review the string lines to ensure that the proper grades are being achieved, and that the curb line is straight and un-wavy horizontally and vertically.
- 3.2.2. The concrete for curbs shall be tamped and spaded, or vibrated, so that the forms are completely filled, the concrete thoroughly compacted, and the mortar flush with the faces and top. The top shall be finished with a wood float to an even, smooth and dense surface and, as soon as the forms can be removed, the face shall be similarly finished. The edges of the curb shall be rounded to the required radius with suitable edging tools.
- 3.2.3. In curbs, transverse expansion joints of the preformed cellulose type, 3/16" thick, shall be installed at the point where curved and tangent sections join; opposite joints in abutting concrete pavement; at any catch basin or other similar structure within the limits of the curb; and at intervals of 10-foot maximum spacing.
- 3.2.4. Expansion joints of the preformed cellulose type, 3/16" thick, shall be installed longitudinally between curbs and sidewalks; and longitudinally where curb abuts concrete base or surface courses.
- 3.2.5. Curbs shall be depressed at driveways and entrances as shown on the drawings.

- 3.2.6. Curbs shall also be depressed at intersections to facilitate access by the handicapped. Depressed curbs shall be as shown on the drawings.
- 3.2.7. Curbs shall be cured when the concrete has been finished.
- 3.2.8. During the curing process, suitable signs warning workmen and the general public shall be erected and maintained by the Contractor, as well as means of bridging the newly installed work.
- 3.2.9. Curbs shall be sealed with the specified sealer after seven days. The curb shall be clean and dry before sealing. Sealing manufacturers guidelines for application should be followed.

3.3. FIELD QUALITY CONTROL

- 3.3.1. Concrete samples and testing shall be done as specified in Section 03300, "Cast-in-Place Concrete". If concrete is not sampled and tested, it shall be removed and replaced at Contractor's expense.

PART 4 MEASUREMENT AND PAYMENT

4.1. MEASUREMENT

- 4.1.1. Measurement for concrete curb shall be the linear feet actually constructed.

4.2. PAYMENT

- 4.2.1. Unit price for concrete curb includes excavation, preparation of subgrade, backfill and compaction, supplying and installation of subbase material; construction of the curbs, provisions for roof drain connections, expansion joints, backfilling, finishing, curing, sealing, cleaning up, and all else incidental and necessary to complete the work.

** END OF SECTION **

SECTION 02535

BREAKING INTO EXISTING MANHOLES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Breaking through the walls and inverts of existing manholes.
 - 2. Connecting new pipes to existing structures.
 - 3. Ancillary work associated with making the new connections to the existing structures.

1.2 REFERENCES

- A. ASTM C443 - Standard Specification for Joints for Circular Concrete Sewer and Culvert Piping Using Rubber Gaskets.
- B. ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals.

1.3 SUBMITTALS

- A. Submit shop drawings showing pipe connection details.

1.4 QUALITY ASSURANCE

- A. Personnel shall have confined space entry training as appropriate for the work to be performed.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Flexible Pipe-to-Structure Connectors
 - 1. The flexible connectors shall be designed to provide a positive seal between the connector and the structure wall and between the connector and the pipe.
 - 2. The flexible boot shall be manufactured of EPDM synthetic rubber in accordance with ASTM C443 and C923 and shall be 3/8 inch thick or greater.
 - 3. The external bands shall be made entirely of 304 series non-magnetic stainless steel.
 - 4. The flexible connectors shall be provided with a wedge-type or toggle-type expander to secure the pipe in the structure opening.
 - 5. The flexible connectors shall meet the following criteria, in accordance with ASTM C923:
 - a. Shall not leak when subjected to a head pressure of 10 psi for 10 minutes.
 - b. Shall have the ability to deflect 7 degrees in any direction without leakage under the head pressure conditions described above.

- c. Shall not leak when subject to a load of 150 lbs./in. pipe diameter and the head pressure conditions described above.
- B. Non-shrink, water-proof grout: Non-shrink, water-proof grout shall be Hallemite; Waterplug; Embeco; or equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. General

- 1. Core drill into existing structures in such a fashion as to make an opening of suitable size to accommodate the connecting pipe without excessive damage to the existing structure.

B. Manholes

- 1. For manholes, break out and rebuild existing inverts as required to provide an adequate base under the new channels being installed, and shaped to provide smooth continuous hydraulic flow through the manhole.
- 2. Control existing flows as required during the period of construction. No sewage will be permitted to flow directly against concrete or other masonry work until it is at least 48 hours old.
 - a. Temporary handling of sewage flows may be accomplished by inserting pipes from the inlet to the outlet of the manhole and by using temporary plugs, where appropriate, provided that such pipes do not interfere with satisfactory completion of the work and shaping of the inverts, nor cause excessive backing-up in the existing system upstream of the diversion. In cases where this type of temporary handling of flows is not possible, provide the necessary dams, plugs, etc., as required in upstream manholes, and pump the flow around the structure under construction.
 - b. When sewage is pumped or otherwise diverted around a particular structure, it shall be discharged back into the sewage system through existing downstream manholes. Under no circumstances shall sewage be permitted to run onto the surface of the ground.

C. Pipe Connections

- 1. Rebuild and tightly close existing manhole walls and inverts to provide an integral, water-tight structure around the new pipes.
- 2. For pipes with smooth exterior surfaces (PVC, ductile iron, HDPE, steel, etc), use flexible pipe-to-structure connectors.
- 3. Where flexible pipe-to-structure connectors cannot be used, such as pipes with rough, irregular or corrugated exterior surfaces (concrete, or HDPE, etc):
 - a. After the new pipe has been set in place, completely fill the hole around the new pipe and structure with non-shrink, water-proof grout.

- b. Place a 6 inch thick concrete encasement a total of 12 inches in length around the pipe stub adjacent to the exterior wall of the structure. Concrete shall have a 28 day compressive strength of 3,000 psi.

END OF SECTION

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SECTION 02550

NATURAL GAS SERVICE AND DISTRIBUTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Underground piping and fittings
2. Above ground piping and fittings
3. Valve boxes
4. Underground warning tape
5. Tracer wire
6. Gas sleeves, unions, and valves
7. Gas filters
8. Gas pressure regulators
9. Risers
10. Meters
11. Installation, testing and other normal parts that make the natural gas service and distribution system complete, operable, code compliant and acceptable to the authorities having jurisdiction.

B. The Contractor's responsibilities include:

1. Arrangement with Utility Company for new natural gas service, including meter set and service regulators, and payment of Utility Company charges for installing the service connection.
2. Installation of underground gas line between the new Utility Company service regulator and the intended service connections, ready for operation, including cathodic protection where required, and all appurtenant structures.
3. Payment to Utility Company for all natural gas consumed during construction and testing. Arrange for reading of all customer meters prior to and after all charging, purging, and testing activities that consume natural gas as part of the work under this section.

C. Related Sections

1. Section 02315 – Excavation, Backfill and Compaction

1.2 REFERENCES

- A. American Society of Mechanical Engineers (ASME)/American National Standards Institute (ANSI):

1. B16 – Standards of Pipes and Fittings
2. B31.8 – Gas Transmission and Distribution Piping Systems
- B. American Society for Civil Engineers (ASCE)
 1. 25 Earthquake-Actuated Automatic Gas Shutoff Devices
- C. American Society for Testing and Materials (ASTM):
 1. A53 – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
 2. A105 – Standard Specification for Carbon Steel Forgings for Piping Applications
 3. A106 – Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service
 4. A234 – Standard Specification for Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service
 5. D2513 – Thermoplastic Gas Pressure Pipe, Tubing, and Fittings
 6. D2683 – Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing
 7. D3350 – Polyethylene Plastics Pipe and Fittings Materials
- D. National Fire Protection Association (NFPA)
 1. NFPA 54 – National Fuel Gas Code
- E. Underwriters Laboratories
- F. 2020 Fuel Gas Code of New York State

1.3 DEFINITIONS

- A. Gas Main or Distribution Main: a distribution line that serves as a common source of supply for more than one service line.
- B. Gas Service Line: a distribution line that transports gas from a common source of supply to the meter set assembly.

1.4 SERVICE DESCRIPTION

- A. Natural gas service shall be provided by the Utility Company at the West Main Street Pump Station in Beacon, NY, as shown on the Drawings.
- B. The Utility Company shall provide new meter and service regulators, designed by the Utility Company to accommodate the required loads.
- C. The Utility Company shall provide all gas piping modifications at the service regulators.
- D. The Utility Company shall provide necessary excavation, trenching, backfill, and compaction, as required to make modifications to the meter set and regulators.

1.5 UTILITY COMPANY

- A. Utility Company: Central Hudson Gas and Electric Corp., 845-897-6152 (Kerrie Pratt is the Utility Company contact)

1.6 SUBMITTALS

- A. Provide details of system components and pipe connections. Provide product data or catalog cuts for piping, fittings, flanges, gas pressure regulators, level gauges, manual valves, valve boxes, and gas filters. Submit catalog sheets with information on the system components, including, but not limited to grade, class or type, schedule number, pressure and temperature ratings, removal efficiency of gas filters, and flow capacities of gas pressure regulators. Include rated capacities of selected models, furnished specialties, and accessories.
- B. Shop Drawings detailing dimensions, required clearances and layout of complete system, showing all piping above and below grade and limit of system.
- C. Provide installation instructions.
- D. Maintenance data for gas specialties and regulators for inclusion in Operation and Maintenance Manual.
- E. Provide Manufacturer's Certification of Compliance with specified standards for all piping, fittings, flanges, pipe coatings, gas pressure regulators, and valves.
- F. Welders Qualifications.
- G. Extra Materials:
 - 1. Valve Wrenches - Furnish to Owner, with receipt, 2 valve wrenches for each type of gas valve installed.

1.7 QUALITY ASSURANCE

- A. All materials, equipment and Work shall meet or exceed all applicable federal, state and local requirements and conform to codes and ordinances of authorities having jurisdiction. All accessories and appurtenances required to meet applicable codes shall be provided by the Contractor whether or not shown on the drawings.
- B. NFPA 54 - National Fuel Gas Code, for gas piping materials and components, gas piping installations, and inspection, testing, and purging of gas piping systems.
- C. Comply with New York State Fuel and Gas Code.
- D. Valves: Manufacturer's name, size, standards compliance, and pressure rating clearly marked on outside of valve body.
- E. Welding Materials and Procedures: Conform to ASME Code and applicable state labor regulations.
- F. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience.
- G. Installer Qualifications: Company specializing in performing the Work of this Section with minimum three (3) years documented experience. Installation of natural gas piping systems shall be performed by individuals licensed in the state

where the work is performed. Welders shall be certified in accordance with ASME Section 9.

- H. Approval by Engineer is required of products or services of proposed manufacturers, suppliers, and installers, and will be based upon submission by Contractor for certification that:
 - 1. Manufacturers regularly and currently manufacture shutoff valves, gas filters, regulators, and meters.
 - 2. The design and size of each item of equipment provided for this project is of current production and has been in satisfactory and efficient operation on at least three installations for approximately 3 years. If elements of equipment lack a substantial experience record, such lack shall be brought to the attention of the Engineer at the time of submission of Shop Drawings, with full information included to permit proper evaluation.
- I. Apply and install materials, equipment, and specialties in accordance with manufacturer's written instructions. Conflicts between the manufacturer's instructions and the Contract Drawings and Specifications shall be referred to the Engineer for resolution. Provide copies of installation instructions to the Engineer prior to commencing installation of any item.
- J. Assembly of Plastic Piping: Installation personnel shall have been trained, tested, and certified under a procedure approved by the manufacturer of the piping. Proof of certification, in writing, shall be provided to the Engineer.
- K. Comply with rules and regulations of the local utility having jurisdiction in all cases where gas lines are connected to public utility services.

PART 2 PRODUCTS

2.1 GENERAL

- A. All materials shall meet or exceed all applicable referenced standards, federal, state, and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

2.2 UNDERGROUND PIPING AND FITTINGS

- A. Polyethylene (PE) Pipe, Tubing, and Fittings: Products shall conform to ASTM D3350 and ASTM D2513, pipe designations PE 2406 or PE 3408. Minimum wall thickness shall conform to ANSI/ASME B31.8. PE pipe is for underground use only. Polyethylene pipe shall not be used where gas pressures are above 690 kPa (100 psi) or with operating temperatures below 7 degrees C (20 degrees F) or above 60 degrees C (140 degrees F).
- B. Polyethylene pipe joints shall be heat fusion, either butt fusion conforming to ASTM D2513 or socket fusion conforming to ASTM D2683.
- C. Valves shall be suitable for shutoff or isolation service. All valves on polyethylene pipe for underground installation shall be a full port and shall conform to ASME B16.40.

2.3 ABOVE GROUND PIPING AND FITTINGS

- 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:
 - a. Systems under 5 PSI: Threaded for pipe 2 inch and smaller; welded for pipe 2-1/2 inches and larger.
 - b. Systems 5 PSI and greater: Welded joints only.
- B. Fittings:
 - 1. Screwed Fittings - 3000#, ASTM A-105, dimensional standards in accordance with ANSI B16.11.
 - 2. Socketweld Fittings - 3000#, ASTM A-105, dimensional standards in accordance with ANSI B16.11.
 - 3. Buttweld Fittings - ASTM A-234 WPB, seamless, dimensional standards in accordance with ANSI B16.9.
 - 4. Flanges - 150# RF, ASTM A-105, screwed or weldneck, dimensional standards in accordance with ANSI B16.5.
 - 5. Unions - 1/2 inch to 3/4 inch 6000#, 1 inch to 1 1/2 inch 3000#, ASTM A-105, socketweld or screwed.
 - 6. Bolting - Stud bolts with two heavy hex nuts, ASTM A-193, Grade B7 continuously threaded stud bolt, ASTM A-194 Grade 2H nuts, dimensional standards in accordance with ANSI B16.5.
 - 7. Gaskets - {Fluorinated elastomer, compatible with flange faces}. {1/8 inch thick, 150# spiral wound 304SS with {non-}asbestos filler}.
- C. Joining Materials
 - 1. Joint Compound - suitable for the gas being handled.
 - 2. Gasket Material - 1/8 inch thick, 150# spiral wound 304SS with graphite filler or aluminum O-rings. Asbestos will not be accepted in any gasket.
- D. Valves
 - 1. Gas Cocks less than 2 inch - 150 psi WOG, bronze body, straightaway pattern, square head, threaded ends.
 - 2. Gas Cocks - 2 inch and Larger - MSS SP-78; 175 psi, lubricated plus type, semi-steel body, single gland, wrench operated, flanged ends.
- E. Piping Specialties: Dielectric Unions - ANSI B16.39, Class 250; malleable iron and cast bronze; with threaded or soldered end connections suitable for pipe to be joined; designed to isolate galvanic and stray current corrosion.
- F. Protective Coatings - When piping will be in contact with material or atmosphere exerting a corrosive action and for buried pipe, pipe and fittings shall be factory-coated with polyethylene tape, having the following properties:

1. overall thickness; 20 mils;
2. synthetic adhesive;
3. water vapor transmission rate, gallons per 100 square inch - 0.10 or less.
4. water absorption, percent - 0.02 or less.
5. Prime pipe and fittings with a compatible primer prior to application of tape.

2.4 RISERS

- A. Provide Manufacturer's standard prefabricated transition anodeless riser from plastic to steel piping.

2.5 VALVE BOXES

- A. Cast iron extension box with screw or slide type adjustment and flared base. Minimum thickness of metal, 5 mm (3/16 inch). Box shall be of such length as can be adapted, without full extension, to depth of cover required over pipe at valve location.
- B. Cast the work "GAS" in cover.
- C. Provide 2 "T" handle socket wrenches of 16 mm (5/8 inch) round stock long enough to extend 600 mm (2 feet) above top of deepest valve box.
- D. Provide box with heavy coat of bituminous paint.

2.6 UNDERGROUND WARNING TAPE

- A. Minimum 3 inch wide polyethylene detectable type marking tape. The tape shall be resistant to alkalis, acids and other destructive agents found in soil and impregnated with metal so that it can be readily recognized after burial by standard locating equipment.
- B. Lamination bond of one (1) layer of Minimum 0.35 mils thick aluminum foil between two (2) layers of minimum 4.3 mils thick inert plastic film.
- C. Minimum tensile strength: 63 LBS per 3 IN width.
- D. Minimum elongation: 500 percent.
- E. Provide continuous yellow with black letter printed message repeated every 16 to 36 inches warning of pipe buried below (e.g.: "CAUTION GAS LINE BURIED BELOW").
- F. Manufactured by Reef Industries "Terra Tape" or equal.

2.7 TRACER WIRE

- A. All tracer wire shall be 12 AWG solid copper wire coated with .45 mils Type HMW - PE yellow insulation. The wire shall meet all requirements of the latest version of ASTM D1351 and ASTM B8. Tracer wire shall be UL listed as direct burial wire at temperatures between -40o C and 75o C for circuits not exceeding 600 volts. The surface of the insulation shall be durably marked, at intervals not exceeding 24 inches, with only the following information: maximum working

voltage "600 VOLTS", wire type, manufacturer's name or trademark, AWG size or circular mil area, UL required markings.

2.8 CASING

Where indicated at railroad or other crossings, provide ASTM A53 galvanized pipe Schedule 40 with extruded polyethylene coating.

2.9 GAS FILTER

- A. Replaceable glass-fiber or cellulose cartridge with 10 micron particle retention. Filter enclosure shall be pipe size of the regulator or larger as required by pressure drop considerations. Static pressure capability shall be at least twice lockup pressure of service supply.
- B. Plug all drains or instrumentation outlets. Provide vent with cock for relieving pressure in filter.

2.10 GAS PRESSURE REGULATORS

- A. All pressure regulators shall be designed, manufactured and approved for natural gas service.
- B. Pressure regulators for individual service lines shall be capable of reducing distribution line pressure to pressures required for users. Pressure relief shall be set at a lower pressure than would cause unsafe operation of any connected user. Regulator shall have a single port with orifice diameter no greater than that recommended by manufacturer for the maximum gas pressure at the regulator inlet. Regulator vent valve shall be of resilient materials designed to withstand flow conditions when pressed against valve port. Regulator shall be capable of limiting build-up of pressure under no-flow conditions to 50 percent or less of the discharge pressure maintained under flow conditions.
- C. Commercial grade diaphragm type with internal relief valve, vent valve, cast iron body, Buna-N diaphragm.
- D. Manufactured by Rockwell or Fisher, or equal.

2.11 METERS

- A. Gas meters shall be furnished and installed of type approved by the Utility Company listed previously, as specified herein.
- B. Meters shall comply with ANSI B109.2. Meters shall be pipe pedestal mounted. Meters shall be provided with over-pressure protection as specified in ASME B31.9 tamper-proof protection, frost protection, and fungus-proof protection. Meters shall be suitable for accurately measuring and handling gas at pressures, temperatures, and flow rates indicated.

PART 3 EXECUTION

3.1 GENERAL

- A. Conform to the requirements of NFPA 54 - National Fuel Gas Code and State and Local Codes.

3.2 UNDERGROUND GAS LINE INSTALLATION

- A. Pipe for underground gas lines shall be polyethylene. Polyethylene shall not be installed above ground.
- B. Gas distribution system and equipment shall be installed in accordance with the manufacturer's recommendations and applicable sections of B31.8 and NFPA 54.
- C. Excavation and backfilling shall be as specified in Section 02315.
- D. Other utilities shall have right of way.
- E. Warning tape shall be continuously placed 300 mm (12 inches) above buried gas lines.
- F. Make service connections at the top of the main, whenever the depth of the main is sufficient to allow top connections. When service connections cannot be made at the top of the main, they shall be made on the side of the main as close to the top as possible. Service connections shall not be made lower than the horizontal midpoint of the gas main.
- G. Before entering building, underground service line shall rise above grade close to building to permit possible gas leaks to vent themselves.
- H. Mains shall have a 42 inch minimum cover or as recommended by local utility.
- I. Service lines shall have a 450 mm (18 inch) minimum cover or as recommended by local utility.
- J. Where indicated, the main shall be concrete-encased, sleeved. Non-metallic pipe to be concrete encased shall be sleeved as indicated. The sleeve shall be sloped and vented to atmosphere at the highest point or where shown.
- K. Connections between metallic and plastic piping shall be made only outside, underground, and with approved transition fittings.

3.3 APPLICATION OF PLASTIC TAPE

- A. Where connection to an existing steel line is made underground, tape wrap new steel transition fitting and exposed existing pipe having damaged coating.
- B. Clean pipe to bare metal free of burrs and rust before taping. Damaged coating shall be smoothed down or cut away if not firmly bonded to the pipe.
- C. Wrap spirally with a two-layer wrapping system, overlapping the coating surface at least 75 mm (3 inches). Initially stretch tape sufficiently to conform to the surface to which it is applied, using one layer half-lapped for tape 50 mm (2 inches) or less in width, or one layer lapped at least 25 mm (1 inch) for tape more than 50 mm (2 inches) wide.
- D. A second layer lapped as above, with a tension as it comes off the roll shall then be applied and pressed to conform to the shape of the component.

3.4 PIPING

- A. Install gas piping at a uniform grade of $\frac{1}{4}$ inch in 15 feet, upward to risers, and from the risers to the meter, or service regulator when meter is not provided, or the equipment.

- B. Make reductions in pipe sizes using eccentric reducer fittings installed with the level side down.
- C. Connect branch outlet pipes from the top or sides of horizontal lines, not from the bottom.
- D. Install unions in pipes 2 inch and smaller, adjacent to each valve, at final connections for each piece of equipment. Unions are not required on flanged devices.
- E. Install dielectric unions where piping of dissimilar metals is joined.
- F. Install flanges on valves, apparatus, and equipment having 2½ inch and larger connections.

3.5 BUILDING SERVICE LINES

- A. Install gas service lines to point of connection within approximately 1500 mm (5 feet) outside of buildings to which such service is to be connected and make connections thereto. The point of delivery is the meter set assembly; service regulator; shutoff valve.
- B. Where building services have not been installed, provide temporary caps.
- C. Connect service lines to top of mains by two-strap service clamp or coupling (socket) welded to main and into which is screwed a street tee and street elbow swing, joint assembly.
- D. The service lines shall be as short and as straight as practicable between the point of delivery and the gas main and shall not be bent or curved laterally unless necessary to avoid obstructions or otherwise permitted. Service lines shall be laid with as few as joints as practicable using standard lengths of pipe. Polyethylene service lines shall not be installed aboveground except as permitted in ANSI B31.8.

3.6 TERMINAL EQUIPMENT CONNECTIONS

- A. Install gas cock upstream and within 6 feet of gas appliance. Install a union or flanged connection downstream from the gas cock to permit removal of controls.
- B. Sediment Traps - Install a tee fitting with the bottom outlet plugged or capped as close to the inlet of the gas appliance as practical. Drip leg shall be a minimum of 3 pipe diameters in length.

3.7 SETTING VALVES

- A. Do not install valves under pavement unless shown on Drawings.
- B. Clean valve interior before installation.

3.8 VALVE BOXES

- A. Set cover flush with finished grade.
- B. Protect boxes located in roadway against movement by a concrete slab at least 900 mm (3 foot) square by 150 mm (6 inches) deep.
- C. Set other valve boxes with a concrete slab 450 mm (18 inches) by 450 mm (18 inches) by 150 mm (6 inches) deep and set flush with grade.
- D. All exposed portions of valve boxes shall be painted "Traffic Yellow."

3.9 VALVE INSTALLATIONS

- A. Install valves in accessible locations, protected from physical damage. Tag valves with a metal tag attached with a metal chain indicating the piping systems supplied.
- B. Install a gas cock after each gas pressure regulator.
- C. Install pressure relief or pressure limiting devices that: 1) can be readily operated to determine if the valve is free; 2) can be tested to determine the pressure at which they will operate; and, 3) can be examined for leaking when in the closed position.

- D. Install strainers on the supply side of each control valve, pressure reducing valve, pressure regulating valve, solenoid valve, and elsewhere as indicated.

3.10 PIPE CLEANING

- A. All pipe sections shall be blown down with 690 kPA (100 psi) air to remove all sand, soil and debris.
- B. Blow down procedure shall be down after system is complete, but before valves are installed.

3.11 LABELING

- A. Label elevated pressure piping as follows:
 - 1. Yellow color with black label
 - 2. Gas type and pressure
 - 3. Locations and letter sizing acceptable to authority having jurisdiction.

3.12 ELECTRICAL BONDING AND GROUND

- A. Install above ground portions of gas piping systems, upstream from equipment shutoff valves electrically continuous and bonded to a grounding electrode in accordance with NFPA 70 - "National Electrical Code."
- B. Do not use gas piping as a grounding electrode.
- C. Conform to NFPA 70 - "National Electrical Code," for electrical connections between wiring and electrically operated control devices.

3.13 FILTER AND PRESSURE REGULATOR INSTALLATION

- A. Shall be installed per manufacturer's recommendations, NFPA 54 and applicable State Code listed previously.

3.14 TESTS

- A. Piping System: Inspection, testing and purging shall be in accordance with NFPA 54, B31.8, applicable State Code, and local utility requirements.

END OF SECTION

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PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for providing or constructing manholes at the locations and in accordance with the details shown on the drawings.

1.2. SYSTEM DESCRIPTION

- 1.2.1. Unless otherwise shown on the drawings or required by field conditions and approved by the Engineer, all manholes and drop manholes shall be precast and manufactured using wet-cast concrete methods only with butyl rubber manhole ring gaskets.
- 1.2.2. Drop manholes shall be constructed as shown on the drawings where the vertical distance between the elevation of the invert of incoming pipe and the invert of the outgoing pipe is two feet or greater.
- 1.2.3. Manholes, slabs, and castings shall be designed for AASHTO H-20 loading.
- 1.2.4. Flow channels shall be constructed in the field as shown on the drawings after the completion of adjacent pipe laying operations.
- 1.2.5. Exterior surfaces of manholes, including the bottom of the base shall be coated with two coats of a coal tar epoxy to a minimum total dry film thickness of 16 mils. If, in the opinion of the Engineer, the exterior does not appear sufficiently sealed, Contractor shall apply additional coating in the field.
- 1.2.6. Access into manholes shall be provided as shown on the drawings.
- 1.2.7. For each type of manhole cover installed and for every fifty thereafter, the Contractor shall provided the owner with one set of hooks, keys and lifting devices as may be required by the type of cover provided.

1.3. REFERENCES

- 1.3.1. ASTM A 48 -- Specifications for gray iron castings.
- 1.3.2. ASTM C 32 -- Specifications for sewer and manhole brick (made from clay or shale).
- 1.3.3. ASTM C 139 -- Specifications for concrete masonry units for construction of catch basins and manholes.
- 1.3.4. ASTM C 140 -- Methods of sampling and testing concrete masonry units.

- 1.3.5. ASTM C 207 -- Specifications for hydrated lime for masonry purposes.
- 1.3.6. ASTM C 207 -- Specifications for precast reinforced concrete manhole sections.

1.4. SUBMITTALS

- 1.4.1. Shop drawings for manholes shall conform with the provisions of the Section "Shop Drawings and Samples," Division 1, and shall include, but not be limited to details on joints, reinforcement, steps or ladders, pipe connections, casting weights and dimensions, block, mortar, construction details and design calculations for top slabs if required, signed by a licensed Professional Engineer.

PART 2 PRODUCTS

2.1. ACCEPTABLE MANUFACTURERS

- 2.1.1. Castings, unless otherwise noted on the drawings, shall be as follows:
 - 2.1.1.1. Standard manhole frames and covers shall be Pattern No. 1009 and 1012B as manufactured by Campbell Foundry Company, Harrison, New Jersey, or equal, and shall be **Domestically made**.
 - 2.1.1.2. Watertight manhole frames shall be Pattern No. 1539 as manufactured by Campbell Foundry Company, Harrison, New Jersey, or equal.
 - 2.1.1.3. Standard slab type manhole frames shall be Pattern No. 1728 as manufactured by Campbell Foundry Company, Harrison, New Jersey, or equal.
 - 2.1.1.4. Watertight slab type manhole frames shall be Pattern No. 1564 as manufactured by Campbell Foundry Company, Harrison, New Jersey, or equal.
- 2.1.2. Coatings shall be products of Koppers Company, Inc., Pittsburgh, PA or equal.

2.2. MATERIAL

2.2.1. CASTINGS

- 2.2.1.1. Castings for manhole frames and covers shall be close grained, tough gray iron free from cracks, holes, swells and shrinkage distortion in accordance with ASTM A 48, Class 30B.
- 2.2.1.2. Cross lock bar for watertight manhole covers shall be steel or ductile iron with a bronze lock screw.
- 2.2.1.3. Watertight manhole cover gaskets shall be a ¼-inch flat neoprene gasket.

2.2.2. STEPS

- 2.2.2.1. Manhole steps shall be copolymer polypropylene plastic with steel reinforcement.

2.2.3. MANHOLES

- 2.2.3.1. Precast concrete manholes, bases, risers, slab tops and grade rings shall conform to the requirements of ASTM C 478. Maximum absorption rate shall not exceed 9% using method A of ASTM C 497. Manholes shall be bituminous coated on the exterior.
- 2.2.3.2. Concrete required for forming of flow channels shall conform to the applicable sections of Division 3.

2.2.4. DROP PIPE

- 2.2.4.1. Materials for the drop pipe and fittings shall be as indicated on the drawings and conform to the requirements of their respective Division 2 Sections.

2.2.5. FLEXIBLE PIPE CONNECTIONS

- 2.2.5.1. Flexible watertight pipe connections shall conform to ASTM C 923.

2.2.6. BRICK

- 2.2.6.1. Brick shall be sound, hard and uniform burned brick, and shall be Grade MM in conformance with ASTM C 32.

2.2.7. MORTAR

- 2.2.7.1. Mortar shall be composed of Portland cement, hydrated lime and sand. The volume of sand shall not be less than 2½ and not more than 3 times the volume of cement and lime. The proportion of cement to lime shall be 1:¼. The quality of the items shall be:
- Cement shall be Type II Portland Cement
 - Hydrated lime shall be Type S conforming to ASTM C 207.

2.3. FABRICATION

2.3.1. CASTINGS

- 2.3.1.1. Castings shall be made accurately to the manufacturer's patterns and to the dimensions as shown on the drawing with all bearing surfaces carefully mill machined.

- 2.3.1.2. Allowances shall be made in the patterns so that the specified thickness is not reduced.
- 2.3.1.3. Manhole covers shall be supplied with two watertight pickholes.
- 2.3.1.4. Manhole covers shall be supplied with cast letters and cope pattern. Cope pattern must be approved by the Engineer. Covers should be labeled "Storm" or "Sewer", depending upon application.
- 2.3.1.5. Inner cover of watertight manhole castings shall have two lifting handles.
- 2.3.1.6. No plugging, burning-in or filling will be allowed.
- 2.3.1.7. Frames and covers shall receive two shop coats of a black asphalt paint.

2.3.2. STEPS

- 2.3.2.1. Manhole steps shall be made to the shapes shown on the drawings.

2.3.3. PRECAST MANHOLES

- 2.3.3.1. Manhole bases, risers, cones and slabs shall be manufactured to the dimensions as shown on the drawings and shall be marked immediately after manufacture with diameter, class, wall thickness, date of manufacture, and name or trade mark of manufacturer.
- 2.3.3.2. No more than two inserts for lifting may be cast in each section.
- 2.3.3.3. Joints shall be compatible between sections and connections with pipe.
- 2.3.3.4. Flexible watertight pipe connections shall be cast into all pipe openings in the precast manholes and shall be capable of deflecting a minimum of 10°. Installation shall be in accordance with the manufacturer's written instructions.
- 2.3.3.5. Exterior surface of manholes shall have **two coats** of a bituminous coating.

PART 3 EXECUTION

3.1. INSPECTION

- 3.1.1. All components of precast manholes, block, brick and castings shall be inspected for defects before installation.
- 3.1.2. Damaged pieces shall be repaired or replaced in accordance with the manufacturer's written recommendations, as approved by the Engineer.

- 3.1.3. Damaged pieces that cannot be repaired shall be immediately removed from the job site.

3.2. INSTALLATION

3.2.1. PRECAST MANHOLES

- 3.2.1.1. Manhole bases shall be installed on a 8" compacted base course of Select Material #4, extending one foot beyond the periphery of the base as shown of the drawings.
- 3.2.1.2. Manhole sections shall be set vertical and with sections and steps, if used, in true alignment.
- 3.2.1.3. Rubber gaskets shall be installed in all joints in accordance with the manufacturer's recommendations.
- 3.2.1.4. Inserts for lifting sections shall be thoroughly plugged with rubber plugs made specifically for the sections or with mortar. The mortar, made of 1 part cement to 1½ parts sand, and mixed slightly damp to the touch (just short of balling), shall be hammered into the holes until it is dense, and an excess of paste appears on the surface. Finish smooth and flush with the adjoining surfaces.
- 3.2.1.5. All manhole joints shall be parged inside and out with mortar.
- 3.2.1.6. The interior of all manholes shall be coated with 2 coats of a water stop compound.
- 3.2.1.7. Manhole shall be backfilled with Select Material No. 4 in 6" lifts, and compacted around the entire structure with a jumping jack compactor.

3.2.2. CAST-IN-PLACE MANHOLES OR DOGHOUSE MANHOLES

- 3.2.2.1. Where manholes are indicated on the drawings to be constructed over existing sewers, the existing sewer pipe shall be left undisturbed and the flow maintained through it until the manhole has been completed and accepted or until the receiving facility to where the flow is being diverted is ready to accept the flow, unless otherwise specified, required or ordered, the Contractor shall carefully excavate around and properly support the existing sewer pipe. On completion and acceptance of the manhole, the top portion of the existing sewer pipe shall be carefully removed and the flow channel formed to the limits and in accordance with the details shown on the drawings. Reinforced concrete pipe entering or exiting the manhole shall have the reinforcement cut off and mortared over with a minimum of one half inch of mortar.

3.2.2.2. Where a cast-in-place base section is used, the top of the base section shall have a ring-formed joint cast or formed in the section which shall be compatible with the corresponding precast manhole riser sections.

3.2.2.3. Where doghouse manholes are used, the base slab may be cast-in-place or precast and shall have reinforcing bars extending into the concrete fill used for the flow channel and bench. The doghouse manhole section shall have openings provided by the manufacturer to fit over the existing pipe(s). The opening around the existing pipe(s) shall be sealed with concrete when forming the flow channel to the top of the bench and the remaining opening above the bench with concrete or brick and mortar.

3.2.2.4. Cast-in-place concrete and reinforcement shall be placed in accordance with the applicable Section of Division 3.

3.2.3. MANHOLE FRAMES AND COVERS

3.2.3.1. Frames shall be set with the tops conforming accurately to 1/4" below the grade of the finished pavement or finished ground surface, or as shown on the drawings.

3.2.3.2. Brick shall be used to adjust the grade of the frames no more than 11 inches. Concrete block or grade rings are acceptable.

3.2.3.3. Frames shall be set concentric with the top of the masonry and in a full bed of mortar so that the space between the top of the masonry and the bottom flange of the frame shall be completely filled and watertight.

3.2.3.4. A thick plug of mortar extending to the outer edge of the manhole shall be placed all around and on the top of the bottom flange. The mortar shall be smoothly finished and have a slight slope to shed water away from the frame.

3.2.4. FLOW CHANNELS

3.2.4.1. After the manholes have been built to the proper height and all adjacent pipe has been installed, a concrete flow channel shall be formed as shown on the drawings.

3.2.4.2. Height of the channel shall be the full diameter of the pipes.

3.2.4.3. Benches on the side of the channel shall provide good footing with a slope of 1" on 12" toward the channel.

3.2.5. PIPE CONNECTIONS

3.2.5.1. Flexible, watertight pipe connections shall be made in accordance with the manufacturer's recommendations.

3.2.6. COATINGS

- 3.2.6.1. Exterior coating of the manhole, including the bottom of the base section, shall be two coats of a asphalt tar epoxy. Reduce first coat by 25% and apply succeeding coats within 24 hours. Minimum dry film thickness per coat shall be 8 mils.
- 3.2.6.2. Interior manhole surfaces shall be coated (minimum of 2 coats) with an acceptable water stop material.

3.2.7. FIELD TESTING

Manholes - All sanitary sewer manholes shall be tested for leakage. Manholes shall be tested for leakage in accordance with the following:

- 3.2.7.1. Vacuum Test - This method of testing manholes for leakage involves the use of a device for sealing the top of the manhole cone section and pumping the air out the manhole, creating a vacuum and holding this vacuum for a prescribed period of time. The procedure for this test is as follows:
 - a) All lifting holes in exterior joint shall be filled and painted with an approved non-shrinking mortar. The completed manhole shall not be backfilled prior to testing. Manholes which have been backfilled shall be excavated to expose the entire exterior prior to vacuum testing or the manhole shall be tested for leakage by means of a hydrostatic test.
 - b) All pipes and other openings into the manhole shall be suitably plugged in a manner to prevent displacement.
 - c) A plate with an inflatable rubber ring the size of the top of the manhole shall be installed by inflating the ring with air to a pressure adequate to prevent leakage of air between the rubber ring and manhole wall.
 - d) Air shall then be pumped out of the manhole through an opening in the plate until a vacuum is created inside of the manhole equal to 10 inches of mercury on an approved vacuum gauge. The removal of air shall then be stopped the test time begun.
 - e) The vacuum must not drop to below 9 inches of mercury within a 2 minute test period. If more than 1-inch drop in vacuum occurs with the 2 minute test period, the manhole has failed the test and shall be repaired or reconstructed, and retested.
 - f) Following satisfactory test results, the manhole may be backfilled.

PART 4 MEASUREMENT AND PAYMENT

4.1. MEASUREMENT

- 4.1.1. Measurement of manhole is by the vertical linear foot installed, measured to the nearest tenth of a foot from the invert of the trough to the bottom of the casting.
- 4.1.2. Measurement of casting is by the unit.

4.2. PAYMENT

- 4.2.1. Unit price for manholes and doghouse manholes includes clearing; excavation, dewatering; protecting and shoring of trench walls; protecting existing utilities, structures, and property; manhole base; riser sections; cone or flat slab tops; drop pipe; castings; steps; flow channels; flexible pipe connections; brick; block or grade rings; mortar; coatings and linings; stone bedding, backfilling and compaction; backfill with selection material #4; disposal of surplus and unsuitable material, conducting leakage testing and all else incidental and necessary to complete the work.
- 4.2.2. Unit price for casting includes furnishing and setting of casting to grade, and all else incidental and necessary to complete the work.

** END OF SECTION **

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for providing polyvinyl chloride (PVC) sewer pipe and fittings.

1.2. SYSTEM DESCRIPTION

- 1.2.1. Pipe shall be polyvinyl chloride (PVC) sewer pipe with an integral bell and bell-and-spigot type rubber gasketed joint. Each integral bell joint shall consist of a formed bell complete with a single rubber gasket. Pipe shall be of the diameter shown on the drawings.
- 1.2.2. All fittings shall utilize rubber gasketed joints and be compatible with that of the pipe.
- 1.2.3. The pipe shall be located and installed to the lines and grades shown on the drawings.

1.3 REFERENCES

- 1.3.1. ASTM D 1784 - Specification for rigid poly (vinyl chloride) [PVC] compounds and chlorinated poly (vinyl chloride) [CPVC] compounds.
- 1.3.2. ASTM D 2321 - Recommended practice for underground installation of flexible thermoplastic sewer pipe.
- 1.3.3. ASTM D 3034 - Specification for Type PSM poly (vinyl chloride) [PVC] sewer pipe and fittings.
- 1.3.4. ASTM D 3212 - Specification for joints for drain and sewer plastic pipes using flexible elastomeric seals.
- 1.3.5. ASTM F 477 - Specification for elastomeric seals (gaskets) for joining plastic pipe.
- 1.3.6. ASTM F 679 - Specification for poly (vinyl chloride) [PVC] large-diameter plastic gravity sewer pipe and fittings.

1.4 SUBMITTALS

- 1.4.1. Shop drawings shall be submitted in accordance with the Section "Shop Drawings and Samples," Division 1.

PART 2 PRODUCTS

2.1. MATERIALS

- 2.1.1. Pipe and fittings from 4" to 15" shall comply with ASTM D 3034 with a wall thickness designation of SDR 35 or be manufactured to ASTM D 3034 outside diameters and have a minimum pipe stiffness of 46 PSI pipe and fittings from 18" to 27 " shall comply with ASTM F 679 and shall have a uniform wall thickness.
- 2.1.2. Joints for PVC sewer pipe and fittings shall comply with ASTM D 3212.
- 2.1.3. Rubber gaskets for joints shall comply with ASTM F 477.
- 2.1.4. Maximum laying lengths for 4" and 6" laterals shall be 12½ ft.

PART 3 EXECUTION

3.1. HANDLING AND STORAGE

- 3.1.1. Handle pipe and fittings with care to prevent damage. Store pipe on flat surfaces so the barrels are evenly supported. If materials are stored outside for extended period of time, cover with opaque material to protect from direct sunlight.

3.2. JOINTING AND INSTALLATION

- 3.2.1. Pipe and fittings shall be installed in accordance with the manufacturer's recommendations and as specified in ASTM D 2321 as modified herein.
- 3.2.2. Field cut pipe shall have square cut ends. Remove burrs inside and outside of pipe. Bevel outside edge for insertion into the gasketed bell to match the factory bevel and mark the new full insertion depth line.
- 3.2.3. Pipe bedding shall have a minimum thickness of 6" and shall be compacted to the density shown on the drawings. The bedding shall be shaped to have contact with the pipe for an angle of at least 90°.

- 3.2.4. Suitable material for pipe embedment shall be placed and compacted in three successive courses.
- 3.2.5. Haunching material shall be placed to the spring line of the pipe and compacted by hand adjacent to the pipe and by mechanical tampers elsewhere. Sufficient material shall be worked under the haunch of the pipe to provide adequate side support. Precautions shall be taken to prevent movement of the pipe during placement of the haunch.
- 3.2.6. Material for initial backfill shall be as shown on the drawings. Initial backfill shall be placed in two stages. The first stage shall be to the top of the pipe. The second stage shall be to a point at least 12" over the top of the pipe.
- 3.2.7. Upon completion of placement of pipe embedment material for each course, the material shall be compacted to the densities shown on the drawings. Contact between the pipe and the compaction equipment shall be avoided.

3.3. TESTING

- 3.3.1. Following installation of pipe and completion of backfill to existing grade, pipe shall be tested for deflection in the presence of the engineer. Optional devices for testing include properly sized Go-No-Go Mandrell or Delectometer. Maximum allowable deflection shall be five percent. All pipes found in which the deflection exceeds five percent shall be uncovered and reinstalled at no additional expense to the owner.
- 3.3.2. Infiltration and exfiltration testing shall be in accordance with the requirements of the Section "Testing and Inspection of Gravity Lines," Division 2.

PART 4 MEASUREMENT AND PAYMENT

4.1. MEASUREMENT

- 4.1.1. Measurement for PVC sewer pipe is by the linear foot measured along the center line of the pipe from end to end of the pipe excluding the length measured through bells, fittings, valves, and manholes in the line of the pipe.
- 4.1.2. Measurement for PVC tee-wye fittings for connection of sewer services shall be by the unit.

4.2. PAYMENT

- 4.2.1. Unit price for PVC sewer pipe includes clearing; excavation (other than rock); dewatering; protecting and shoring of trench walls; protecting existing utilities, structures, and property; saw cutting of pavement; coatings and linings; backfilling and compaction; backfill material (other than crushed stone bedding, select, or suitable material from off site, unless otherwise stated in bid forms); by-pass pumping; fittings; disposal of surplus and unsuitable material; restoration (other than pavement); testing and, all else incidental and necessary to complete the work.

4.2.2. Unit price for PVC tee-wye fittings includes fitting; installation of fitting; labor; and all else incidental and necessary to complete the work. All work as related to excavation, backfilling, compaction, shoring, testing, etc., shall be taken into consideration within the unit price for PVC sewer pipe.

**** END OF SECTION ****

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for providing C900 PVC pressure pipe.

1.2. SYSTEM DESCRIPTION

- 1.2.1. **C900 DR-25 PVC pressure pipe and ductile iron fittings shall be installed at the locations and in accordance with the details shown on the drawings for the proposed force main.**
- 1.2.2. Pipe shall have an integral bell and bell-and-spigot type rubber gasketed joint. Each integral bell joint shall consist of a formed bell complete with a single rubber gasket. Pipe shall be of the diameter shown on the drawings.
- 1.2.3. All fittings shall utilize rubber gasketed joints and be compatible with that of the pipe.
- 1.2.4. The contractor shall furnish all labor, materials, tools and equipment necessary for or incidental to the performance of the pressure/leakage test.
- 1.2.3. The contractor shall be responsible to secure a water supply for testing at no additional cost to the owner.
- 1.2.4. A pressure/leakage test will be performed on all PVC Pressure Pipe and fittings in the system constructed. The pressure/leakage test shall be conducted in accordance with these specifications and the applicable requirements of AWWA C600 (latest edition). Where any section of a main is provided with concrete thrust blocks, the test shall not be made until at least 5 days have elapsed after the concrete was installed.
- 1.2.5. All testing of lines shall be done in the Engineer's or Water & Sewer Department's presence and under their direction.

1.3 REFERENCES

- 1.3.1. ASTM D-1784 - Specification for Rigid Poly (Vinyl Chloride) [PVC] compounds and Chlorinated Poly (Vinyl Chloride) [CPVC] compounds.
- 1.3.2. ASTM D-2774 - Recommended practice for underground installation of thermoplastic pressure piping.
- 1.3.3. ASTM D-3139 - Specification for joints for plastic pressure pipe using flexible elastomeric seals.

- 1.3.4. ASTM F-477 - Specification for elastomeric seals (gaskets) for joining plastic pipe.
- 1.3.5. AWWA C600 (latest edition) - Standard for the Installation of Ductile-Iron Water Mains and Their Appurtenances.

1.4 SUBMITTALS

- 1.4.1. Shop drawings shall be submitted in accordance with the Section "Shop Drawings and Samples", Division 1.

PART 2 PRODUCTS

2.1. MATERIALS

- 2.1.1. Pipe and fittings shall conform to the requirements of ASTM D-1784 for SDR-25. Nominal laying length shall be 20 feet.
- 2.1.2. Joints shall conform to the requirements of ASTM D-3139.
- 2.1.3. Gaskets shall conform to the requirements of ASTM F-477.
- 2.1.4. The pipe shall be marked in accordance with the standards to which it is manufactured. Marking shall include the following items: Nominal size, dimension ratio, manufacturer's name or trademark, pressure class, etc.
- 2.1.5. Detectable marking tape shall be approved by the engineer and placed between 12 to 18 inches above the crown of the pipe.

PART 3 EXECUTION

3.1. HANDLING AND STORAGE

- 3.1.1. Handle pipe and fittings with care to prevent damage. Store pipe on flat surfaces so the barrels are evenly supported. If materials are stored outside for extended period of time, cover with opaque material to protect from direct sunlight.

3.2. JOINTING AND INSTALLATION

- 3.2.1. Pipe and fittings shall be installed in accordance with the manufacturer's recommendations and as specified in ASTM D-2774 as modified herein. Fittings on force main shall be ductile iron
- 3.2.2. Field cut pipe shall have square cut ends. Remove burrs inside and outside of pipe. Bevel outside edge for insertion into the gasketed bell to match the factory bevel and mark the new full insertion depth line.

- 3.2.3. Pipe bedding shall have a minimum thickness of 6" and shall be compacted to the density as described with these Specifications in maximum lift of 6". The bedding shall be shaped to have contact with the pipe for an angle of at least 90°.
- 3.2.4. Select Material No. 4 (NYSDOT Item No. 304.12) shall be used for pipe embedment and shall be compacted in 8" lifts, achieving 95% modified proctor density.
- 3.2.5. Haunching material shall be placed to the spring line of the pipe and compacted by hand adjacent to the pipe and by mechanical tampers elsewhere. Sufficient material shall be worked under the haunch to the pipe to provide adequate side support. Precautions shall be taken to prevent movement of the pipe during placement of the haunch.
- 3.2.6. Material for initial backfill shall be Select Material No. 4. Initial backfill shall be placed in two stages. The first stage shall be to the top of the pipe. The second stage shall be to a point at least 12" over the top of the pipe.
- 3.2.7. Upon completion of placement of pipe embedment material for each course, the material shall be compacted to the densities shown on the drawings. Contact between the pipe and the compaction equipment shall be avoided.

3.3. PRESSURE TESTING

- 3.3.1. Once line has been installed into manhole structures, contractor shall install ductile iron caps on the C900 pipe, at both ends, to allow for pressure testing of the newly installed line. One cap shall be provided with a test port to allow for pressurizing of the pipeline and expelling of air. The caps shall be braced within the manhole structures to ensure that they do not blow-off during testing. Once the caps have been installed, the line shall be filled slowly with water and the air within the line bled off.
- 3.3.2. All air shall be expelled from the section to be tested. After all the air has been expelled, the test pressure shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Engineer. **The pump, pipe connections, and all necessary apparatus shall be furnished by the contractor at the Contractor's expense.**
- 3.3.3. The test pressure shall be at least two times the maximum working pressure, based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge. However, in no case shall the test pressure be less than 150 pounds per square inch. Each hydrostatic test shall be held at the test pressure for a duration of at least one hour. Additional water shall be added as required to maintain the test pressure.

- 3.3.4. Concurrently with the pressure test, a leakage test shall be conducted. Leakage is defined as the quantity of water that must be added to the pipe to maintain the test pressure. Maximum allowable leakage shall be determined by the following formula:

$$\frac{SD \sqrt{P}}{L = 148,000}$$

Where,

- L = Allowable leakage, in gals/hour
- S = Length of test section, in feet
- D = Nominal diameter of pipe, in inches
- P = Average test pressure during test, in PSIG

- 3.3.5. Tolerance for test pressure shall be plus or minus 5 psi.
- 3.3.6. Where the leakage for the section tested is greater than that allowed, the contractor shall locate and repair the cause of the leak and retest the section until the leakage does not exceed the allowable.
- 3.3.6. Once testing has been successfully completed, the Contractor shall remove the caps and all blocking/bracing used for the caps. Once all material has been removed, contractor shall complete required installation of force main and force main connections to other assemblies or structures.

PART 4 MEASUREMENT AND PAYMENT

4.1. MEASUREMENT

- 4.1.1. Measurement for C900 PVC pressure pipe is by the linear foot measured along the centerline of the pipe from inner wall of structure or pipe beginning to inner wall of manhole structure or end of pipe.

4.2. PAYMENT

- 4.2.1. Unit price for C900 DR-25 PVC pressure pipe includes saw cutting of pavement, excavation (other than rock); dewatering; protecting and shoring of trench walls; protecting existing utilities, structures, and property; pipe; pipe bedding; installation of pipe; connection to manhole structures, including water-tight seal at penetration; backfilling with Select Material No. 4 (NYSDOT 304.12) in 8" lifts; compaction of backfill material; detectable marking tape in trench line; pressure testing, including supplying of water, pipe end caps, and bracing of caps; disposal of all wastes, equipment, labor, tools and all else incidental and necessary to complete the work.

**** END OF SECTION ****

SECTION 02627
COPPER PIPE (BURIED) & NECESSARY FITTINGS

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for providing buried copper pipe and fittings.

1.2. SYSTEM DESCRIPTION

- 1.2.1. Copper pipe and fittings shall be used for the potable water lines and other piping less than two (2) inches in diameter unless otherwise indicated on the drawings.
- 1.2.2. All fittings shall be compressive type.
- 1.2.3. Buried copper pipe shall be tested to the pressures shown on the drawings and in accordance with the section "Testing and Inspection of Water Mains", Division 2.
- 1.2.4. Buried copper pipe shall be Type K conforming to ASTM B88.
- 1.2.5. A tap, equal to the existing size entering the building, shall be left or made for each required service connection (as shown on plans). Taps may be made by means of a tapped coupling at proper location or by cutting with an approved tapping machine, or by use of service saddles approved by Engineer. Taps shall be of the type thread to accept a standard corporation stop as supplied by Mueller, or an approved equal. **Mechanical joint tapped tees shall be used for all taps larger than 1".**
- 1.2.6. Taps and corporation stops should be located at least 1' from pipe ends. Corporation stops shall be Mueller H-15008N (¾", 1") or approved equal.
- 1.2.7. Curb stops shall be Mueller H-15209N (¾", 1"), or approved equal. The curb box shall be Mueller H-10385 or approved equal.
- 1.2.8. Backflow prevention for water service shall be Watts Series 007 double check valve assembly.

1.3. QUALITY ASSURANCE

- 1.3.1. All pipe shall be factory tested in accordance with the requirements of ASTM B88. All fittings shall meet or exceed AWWA C-800 Standards (latest revision).

1.4. SUBMITTALS

- 1.4.1. Shop drawings shall be submitted in accordance with the Section "Shop Drawings and Samples", Division 1.
- 1.4.2. Certified factory test results shall be submitted on pipe and fittings manufactured for this project or another project within the past six months.
- 1.4.3. List stating size and number of water services to each building, if applicable.

PART 3 EXECUTION

3.1. INSPECTION

- 3.1.1. Pipe and fittings shall be checked for defects prior to their incorporation in the work. All pipe and fittings found to be defective shall be promptly removed from the site.

3.2. PREPARATION

- 3.2.1. Pipe shall be swabbed or brushed out prior to installation to ensure that no foreign material gets into the finished line.

3.3. INSTALLATION/ APPLICATION/ERECTION

- 3.3.1. Contractor shall obtain the size and number of water services entering into each building prior to construction of water main.
- 3.3.2. Pipe and fittings shall be installed in accordance with the manufacturer's recommendations.
- 3.3.3. New water services shall be installed from the new water main up to, and into, the existing residence. Installation of new water service shall include installing of k-copper, curb stop, water meter (supplied by others), backflow preventer, and connection to existing house water system.
- 3.3.4. Prior to water service switch over, homeowners shall be notified at least 24 hours in advance.
- 3.3.5. New copper line shall be backfilled with at least 12" of suitable material.

3.4. ADJUSTING AND CLEANING

- 3.4.1. Prior to final acceptance, the Contractor shall clean the lines of all foreign material.

** END OF SECTION **

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for providing restraint systems to resist axial thrust.

1.2. SYSTEM DESCRIPTION

- 1.2.1. Install joint restraints/thrust blocks to resist axial thrust at the locations and of the size and type shown on the drawings. Unless thrust blocks are shown on the drawings, only joint restraints shall be used.
- 1.2.2. Unless otherwise shown on the drawing, joint restraints shall consist of:
1. Mechanical joint pipe with mechanical joint retainer glands
 2. "Locked" or "anchoring" type pipe and fittings as manufactured by EBAA Iron Sales, Inc. Mega-Lug Series 1100 or equal.
- 1.2.3. Length of pipe to be restrained shall be as shown on the schedule of joint restraints as shown on the drawings.
- 1.2.3. Thrust blocks shall be constructed of concrete as shown on the drawings.

1.3 REFERENCES

- 1.3.1. Bulletin No. 24 - "Outside Protection" as issued by the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts, 02269.
- 1.3.2. ASTM E18 - Test for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials.
- 1.3.3. ANSI A21.10 - Standard for Gray-Iron and Ductile Iron Fittings 2 Inches through 48 Inches for Water and Other Liquids.
- 1.3.4. New York State Department of Transportation Standard Specifications

1.4. SUBMITTALS

- 1.4.1. Submit manufacturer's certification or certified test results indicating conformance with the requirements of these specifications for retainer glands and other joint restraint materials.
- 1.4.2. Submit manufacturer's data for "locked" or "anchoring" type pipe and fittings.

PART 2 PRODUCTS

2.1. MATERIALS

- 2.1.1. Mechanical joint retainer glands shall conform to the applicable requirements on ANSI A21.10 and shall be cast of ductile iron, fitted with cup point, square headed set screw and approved by Underwriter's Laboratories, Inc. Set screw hardness, when tested in accordance with ASTM E18, shall reflect a core hardness within the range of Rockwell C42-48 and a case surface hardness of Rockwell 15N-87 (minimum).
- 2.1.2. "Locked" or "anchoring" type pipe and fittings shall conform to the contract documents.
- 2.1.3. Rods, clamps with washers, straps and other required hardware shall conform to the applicable requirements of "Figures 96. General Information" of Bulletin 24 or as otherwise approved by the Engineer.
- 2.1.4. Thrust blocks shall be concrete with a minimum compressive strength of 2,500 psi.

PART 3 EXECUTION

3.1. INSTALLATION

- 3.1.1. Mechanical joint retainer glands shall be installed in accordance with the manufacturer's commended installation requirements and as required by the "Schedule of Joint Restraints" as shown the drawings. Torque on the set screws shall not exceed that recommended by the manufacturer and shall be applied using an approved torque wrench.
- 3.1.2. "Locked" or "anchoring" type pipe and fittings shall be installed in accordance with the manufacturer's recommended installation procedures.
- 3.1.3. Rods, clamps with washers, straps and other required hardware shall be installed in accordance with the applicable requirements of Figures 96-1 through 96-37 in Section 96 of Bulletin 24 or as shown on the drawings.
- 3.1.4. Concrete thrust blocks shall be constructed in accordance with the applicable requirements of the NYSDOT Standard Specifications, and as shown on the drawings. All thrust blocks shall be placed against undisturbed native soil and in such a manner that the pipe and joints will be accessible for inspection or repair.

**** END OF SECTION ****

SECTION 02675
DISINFECTION OF WATER DISTRIBUTION SYSTEMS

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for disinfection of potable water distribution and transmission systems.

1.2. SYSTEM DESCRIPTION

- 1.2.1. The contractor shall furnish all labor, materials, tools and equipment necessary for or incidental to the performance of the disinfection of the water line. The Contractor shall be responsible to secure a water supply for flushing and disinfection at no additional cost to the owner.
- 1.2.2. Disinfection will be conducted on all water mains, valves and fittings in the system constructed. The disinfection shall be performed in an approved manner in accordance with these Specifications and the applicable requirements of AWWA, C-651 (latest revision), except that the tablet method described in Section 5.1 of AWWA C-651 shall not be used.

1.3. REFERENCES

- 1.3.1. AWWA C-651, Standard for Disinfecting Water Mains (latest edition).

1.4. SUBMITTALS

- 1.4.1. Methods of testing shall be submitted for review one week before actual testing.

PART 2 - NOT APPLICABLE

PART 3 EXECUTION

3.1. PREVENTATIVE MEASURES DURING CONSTRUCTION

- 3.1.1. Caution shall be taken to protect pipe interiors, fittings and valves against contamination during construction. Pipe delivered for construction shall be strung so as to minimize entrance of foreign material.
- 3.1.2. When pipe laying is not in progress as, for example, at the end of the close of the day's work, all openings in the pipeline shall be closed by water tight plugs.

- 3.1.3. Joints of all pipe in the trench shall be completed before work is stopped.
- 3.1.4. If water accumulates in the trench, plugs shall remain in place until the trench is dry.
- 3.1.5. If dirt that, in the opinion of the Engineer, will not be removed by flushing operations enters the pipe, the interior of the pipe shall be cleaned and swabbed as necessary with a 5% hypochlorite disinfecting solution.

3.2. DISINFECTION PROCEDURE

3.2.1. PRELIMINARY FLUSHING

- 3.2.1.1. The main shall be flushed prior to disinfection. The flushing velocity shall not be less than 3 feet per second.

3.2.2. FORM OF CHLORINE FOR DISINFECTION

- 3.2.2.1. The most common forms of chlorine used in disinfecting solutions are liquid chlorine (gas at atmospheric pressure), calcium hypochlorite granules, and sodium hypochlorite solution.

- A. Liquid chlorine shall be used only when suitable equipment is available, and only under the direct supervision of a person familiar with the physiological, chemical and physical properties of this element, and who is properly trained and equipped to handle any emergency that may arise. The introduction of chlorine gas directly from the supply cylinder is unsafe and should not be permitted.

The preferred equipment consists of a solution feed chlorinator in combination with a booster pump for ingesting the chlorine gas/water mixture into the main to be disinfected. Direct feed container chlorinators are not recommended because their use is limited in situations where water pressure is lower than the chlorine cylinder pressure.

- B. Calcium hypochlorite contains 70% available chlorine by weight. It is either granular or tabular in form. Tablets, 6 and 9 to the ounce, are designed to dissolve slowly in water. Chlorine solution is prepared by dissolving the granules in water in a proportion required for the desired concentration.

- C. Sodium hypochlorite is supplied in strengths from 5.25 to 16 percent available chlorine. It is packaged in liquid form in glass, rubber, or plastic containers ranging in size from one quart bottles to five gallon carboys. It may also be purchased in bulk for delivery by tank truck.

The chlorine-water solution is prepared by adding hypochlorite to water. Product deterioration must be reckoned with in computing the quantity of sodium hypochlorite required for desired concentration.

3.3. APPLICATION

3.3.1. HYPOCHLORITE SOLUTIONS

- 3.3.1.1. The hypochlorite solutions shall be applied to the water main with a gasoline or electrically powered chemical feed pump designed for feeding the chlorine solutions. For small applications, the solutions may be fed with a hand pump, for example, a hydraulic test pump.
- 3.3.1.2. Feed lines shall be of such material and strength as to withstand safely the maximum pressures that may be created by the pumps. All connections shall be checked for tightness before the hypochlorite solution is applied to the main.

3.3.2. METHODS OF CHLORINE APPLICATION

3.3.2.1. CONTINUOUS FEED METHOD

This method is suitable for general application. Water from the existing distribution system or other approved sources of supply shall be made to flow at a constant, measured rate into the newly-laid pipeline. At a point not more than 10 feet downstream from the beginning of the new main, the water entering the new main shall receive a dose of chlorine, also fed at the constant, measured rate. The two rates shall be proportioned so that the chlorine concentration in the water in the pipe is maintained at a minimum of 25 mg/l available chlorine. To assure that this concentration is maintained, the chlorine residual should be measured at regular intervals in accordance with the procedures described in the current edition of Standard Methods of AWWA M12 - Simplified for Water Examination.

Table II gives the amount of chlorine residual required for each 100 ft. of pipe in various diameters. Solutions of one percent chlorine may be prepared with sodium hypochlorite or calcium hypochlorite. The latter solution requires approximately 1 lb. of calcium hypochlorite in 8.6 gallons of water. If liquid laundry bleach with 5.25% CL is used, then 4.25 gallons of water is to be mixed with 1 gallon of bleach to obtain 1 percent solution.

TABLE II
Chlorine Required to Produce 25 mg/l
Concentration in 100 ft. of pipe

Pipe Size (inch)	Volume of 100-ft. length (gallons)	100 Percent Chlorine (lb.)	1 Percent Chlorine Solutions (gal.)
4	65.3	.013	0.16
6	146.5	.030	0.36
8	261.0	.054	0.65
10	408.0	.085	1.02
12	588.7	.120	1.44

Note: All lines smaller than 4" shall be disinfected with the same concentration used for 4" lines per the New York State Department of Health.

During the application of the chlorine, valves shall be manipulated to prevent the treatment dosage from flowing back into the line supplying the water. Chlorine application shall not cease until the entire main is filled with the chlorine solution. The chlorinated water shall be retained in the main for at least 24 hours, during which time all valves discharge hose connections in the section shall be operated in order to disinfect the appurtenances. At the end of this 24 hour period, the treated water shall contain no less than 10 mg/l chlorine throughout the length of the main.

3.3.2.2. SLUG METHOD

This method is suitable for use with mains of large diameter for which, because of the volumes of water involved, the continuous feed method is not practical.

Water from the existing distribution system or other approved source of supply shall be made to flow at a constant, measure rate into the newly laid pipeline. The water shall receive a dose of chlorine, also fed at a constant measured rate. The two rates shall be proportioned so that the concentration in the water entering the pipeline is maintained at no less than 100 mg/l. The chlorine shall be applied continuously and for a sufficient period to develop a solid column or "slug" of chlorinated water that will as it passes along the line, expose all interior surfaces to a concentration of at least 100 mg/l for at least 3 hours. The application shall be checked at a tap near the upstream end of the line by chlorine residual measurements made according to the procedures described above.

As the chlorinated water flows past tees and crosses, related valves and discharge hose connection shall be operated as to disinfect appurtenances.

3.3.2.3. TABLET METHOD

The "tablet method" as contained in American Water Works Association Standard C-651 is not acceptable to the New York State Department of Health and shall not be used.

3.4. FINAL FLUSHING

- 3.4.1. After the applicable retention period, the heavily chlorinated water shall be flushed from the main until the chlorine concentration in the water leaving the main is no higher than that generally prevailing in the system, or less than 1 mg/l. Chlorine residual determination shall be made to ascertain that the heavily chlorinated water has been removed from the pipeline. Heavily chlorinated water shall be de-chlorinated prior during flushing, or shall be flushed into a tanker truck for proper disposal. At no time shall heavily chlorinated water be discharged into the storm or sanitary sewer systems.

3.5. BACTERIOLOGICAL TESTS

- 3.5.1. After final flushing and before the new water main is placed in service, two consecutive sets of acceptable samples, taken at least 24 hours apart, shall be collected every 1,200 feet and from the end of the line, and at least one set from each branch in the water main. All samples shall be tested for bacteriological (chemical and physical) quality in accordance with "*Standard Methods for the Examination of Water and Wastewater*" and shall show the absence of coliform organisms; and, if required, the presence of a chlorine residual.
- 3.5.2. Samples for bacteriological analysis shall be collected in sterile bottles treated with sodium thiosulfate as required by "*Standard Methods for the Examination of Water and Wastewater*". No hose or hydrant shall be used in collection of samples. A suggested sampling tap consists of a standard corporation cock installed in the main with a copper tube goose-neck assembly. After samples have been collected, the goose-neck assembly may be removed, and retained for future use.

3.6. REPETITION OF PROCEDURE

- 3.6.1. If the initial disinfection fails to produce satisfactory samples, disinfection shall be repeated until satisfactory samples have been obtained. When the samples are satisfactory, the main may be placed in service.

3.7. PROCEDURE AFTER CUTTING INTO OR REPAIRING EXISTING MAINS

- 3.7.1. The procedures outlined in this section apply primarily when mains are wholly or partially dewatered. Leaks or breaks that are repaired with clamping devices while the mains remain full of water under pressure require no disinfection.

3.7.2. TRENCH TREATMENT

- 3.7.2.1. When an old line is opened, either by accident or by design, the excavation will likely be wet and badly contaminated from nearby sewers. Liberal quantities of hypochlorite applied to open trench areas will lessen the danger from such pollution. Tablets have the advantage in such a situation because they dissolve slowly and continue to release hypochlorite as water is pumped from the excavation.

3.7.3. MAIN DISINFECTION

- 3.7.3.1. Swabbing and Flushing: The following procedure is considered as a minimum that may be used.

- A. Swabbing with Hypochlorite Solution: The interior of all pipe and fittings used in making the repair (particularly couplings and tapping sleeves) shall be swabbed with a 1 percent hypochlorite solution before they are installed.
- B. Flushing: Thorough flushing is the most practical means of removing contamination introduced during repairs. If valving and hydrant locations permit, flushing from both directions is recommended. Flushing shall be started as soon as the repairs are completed and continued until discolored water is eliminated.

3.7.3.2. Slug Method

Where practicable, in addition to the procedures of swabbing and flushing, a section of main in which the break is located shall be isolated, all service connections shut off, and the section flushed and chlorinated as described, except that the dose may be increased to as much as 300 mg/l, and the contact time reduced to as little as hours. After chlorination, flushing shall be resumed and continued until discolored water is eliminated.

3.7.4. SAMPLING

- 3.7.4.1. Bacteriological samples shall be taken after repairs to provide a record by which the effectiveness of the procedures used can be determined. If the direction of flow is unknown, samples shall be taken on each side of the main break.

** END OF SECTION **

PART 1 GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Requirements for providing sanitary sewer service connections both gravity and low pressure connections.

1.2. SYSTEM DESCRIPTION

- 1.2.1. Contractor shall be responsible for locating all active sewer service connections located along the sewer main to be replaced. Although a number of these connections have been shown on the plan drawings, it is the Contractor's responsibility to verify the location of all active sewer service connections regardless of what is shown on the plans. Contractor should meet with homeowners, or use other means necessary, to verify the location of active sewer laterals connected to the sewer main, to ensure that all active sewer services are reconnected to the newly proposed sewer main. Contractor shall submit to the Engineer, documentation as to how the location of all active sewer services were determined, and where the active sewer services are located. To help in this endeavor, previous sewer televising reports have been included in the rear of the contract documents.
- 1.2.2. All data relative to the locations and size of the service connections shall be recorded on forms, supplied by the Contractor, and approved by the Owner.
- 1.2.2.1. Each form shall be identified by property owner's name, street address, and lot and block number.
- 1.2.2.2. These forms shall show the location of the end of the service connection.
- 1.2.2.3. Service connections shall be signed by both the property owner and the Contractor's representative.
- 1.2.3. Contractor shall give written notice to property owners at least one week in advance of laying the street main and shall locate the connection so that it will come off the street main 90° to the curb line in order to service the property owner's lowest service elevation or at a general location desired by the property owner, unless otherwise directed or permitted by the Engineer.
- 1.2.4. Service connections shall be made for all active sewer services as shown on the drawings and where located if not shown on the drawings.

- 1.2.5. Contractor shall install new sewer services to a point as determined by Engineer and/or Sewer Superintendent, to allow for reconnection of existing sanitary sewer services to new sanitary sewer main. Connection of new service pipe to old service pipe shall be made by connection of bell on new PVC to existing PVC line or by using a Romac Industries stainless steel Style LSS1 Repair Clamp. If existing sanitary lateral is not PVC, reconnection of line to new PVC extension shall be made with a Romac Industries stainless steel Style SS1 Transition Clamp. Fittings shall be encased in concrete unless otherwise directed by Engineer or Sewer Superintendent. The costs for supplying the additional connection fittings and concrete shall be included in the unit price for the pipe for the sewer service. Sewer piping shall conform and be installed in accordance with Section 02622 of the technical specifications.

1.3. SUBMITTALS

- 1.3.1. Contractor shall submit for approval his intended procedure for installing service connections in accordance with the Section "Review of Contractor's Construction Procedures", Division 1.
- 1.3.2. Shop drawings for service connections shall be submitted in accordance with the Section "Shop Drawings and Samples", Division 1.

**** END OF SECTION ****

SECTION 02724
TESTING AND INSPECTION OF GRAVITY LINES

PART 1 GENERAL

1.1. SECTION INCLUDES

1.1.1. Requirements describing the testing and inspection of gravity lines.

1.2. SYSTEM DESCRIPTION

1.2.1. Visual Inspection

1.2.1.1. Upon completion of the installation of the pipe and backfilling and compacting of the trench, the pipe shall be visually inspected. This inspection shall be undertaken as the work progresses. The engineer shall be notified a week in advance of such inspection and the contractor shall provide all facilities, materials, equipment and labor required for such inspection.

1.2.1.2. All foreign material, dirt, debris or other objects found in the interior of the pipe shall be removed by the contractor. Visible defects such as broken pipe sections, improperly installed gaskets, projecting connections, cracks, visible leaks or other defects shall be noted, corrected and the pipe reinspected.

1.2.2. Infiltration/Exfiltration Testing

1.2.2.1. The engineer shall be notified two weeks in advance of infiltration/exfiltration testing.

1.2.2.2. An infiltration test shall be performed for those lines where the ground water level is at least 2 feet higher than the top of the pipe at the upstream manhole. Where ground water level is lower than two feet above the top of the pipe at the upstream manhole, an exfiltration test shall be performed. Air testing shall be used for the exfiltration test.

1.2.2.3. Rate of infiltration or exfiltration shall not exceed one-hundred gallons per mile per inch of diameter of pipe for 24 hours. Air test allows minimum amount of time for air pressure inside pipe to drop from 3.5 PSIG to 2.5 PSIG; allowable time is a function of pipe size. These requirements will be met for every test section of pipe; it is not a cumulative average over several test sections of pipe. The phrase "per mile" shall refer to the total length of main sewer, measured through manholes, plus the lengths of all connections, laterals and branches.

- 1.2.2.4. The contractor shall construct all bulkheads; provide weirs or other means of measurement, pumps, water, plugs, fittings, meters, lights, hoses and all else necessary for inspection and testings.

1.2.3. Minimum Pipe Slope

- 1.2.3.1. Pipes installed at less than the slopes shown on the drawings shall be reinstalled by the contractor to the design slope shown or the contractor shall demonstrate to the engineer's and owner's satisfaction that the design capacity and velocity can be achieved.

- 1.2.4. During the one year correction period, the system or any part thereof, may be reinspected and/or retested if it is determined by the engineer that defective materials or unsatisfactory work may exist, or that excessive leakage may be occurring. Contractor shall perform the reinspection, retesting, removal and replacement of defective work at no additional cost to the owner.

1.3. REFERENCES

- 1.3.1. ASTM F-1417-92 (reapproved 2005) - "Standard Test method for Installation Acceptance of Plastic gravity Sewer Lines Using Low-Pressure Air".

1.4. SUBMITTALS

- 1.4.1. Certified copies of all tests and final inspection reports shall be submitted to the engineer.

PART 3 EXECUTION

3.1. PREPARATION

- 3.1.1. The pipe section being tested shall be entirely free from any and all debris, stones, sand and any other materials. Water used in flushing the lines shall not be discharged into clean sections of pipeline or active sewers, but shall be discharged as specified in the appropriate parts of the Section "Dewatering," Division 2. Disposal of debris and all other material shall be in conformance with the requirements of the Section "Waste Materials Disposal," Division 1.

3.2. FIELD QUALITY CONTROL

- 3.2.1. The first section of pipe (between two manholes) laid by each pipe crew will immediately be tested upon completion in order to check workmanship.

- 3.2.2. Lines shall be visually inspected from manhole to manhole by the engineer. The contractor shall furnish two men to assist the engineer in making the inspection. It is a condition of acceptance that all manholes be complete, the pipe be cleaned, and all lines be laid straight from manhole to manhole unless otherwise shown on the drawings. All defects noted during this inspection shall be corrected by the contractor to the satisfaction of the engineer. After correction the lines shall be reinspected.
- 3.2.3. When the gravity lines have been satisfactorily inspected visually, an infiltration or exfiltration test shall be performed.
- 3.2.4. Infiltration/exfiltration rates shall be determined on the main sewer and laterals and shall be within the allowable rate as specified. All wyes, tees and other fittings in the main sewer line and laterals shall be adequately capped or plugged to withstand the maximum anticipated head during exfiltration testing and to prevent debris, groundwater, etc., from entering during infiltration testing. All caps or plugs which "blow-out" or leak shall be replaced as often as necessary by the contractor at no additional cost to the owner until the main sewer passes the infiltration/exfiltration test. All sewers not in compliance with these requirements shall be corrected by the contractor until such time as the rate can be met. Such corrections as necessary shall be made by the contractor at no additional cost to the owner.
- 3.2.5. When performing an infiltration test, the contractor shall block off a section of the system not exceeding 1000 linear feet, and install a measuring device at the downstream end of the test section. Infiltration shall not exceed the allowable amount specified. If the actual infiltration exceeds the allowable infiltration or if there are visible signs of infiltration such as gushing or spurting streams, the contractor shall effect all repairs necessary to make the pipe sufficiently watertight. The section shall be retested until the rate of allowable infiltration is met.
- 3.2.7. Air testing shall be used instead of the water exfiltration test to measure exfiltration. The section to be tested shall be between consecutive manholes. Each end of pipe, all branches, laterals, and wyes shall be plugged and securely braced. The plug at each end of pipe shall have provision to connect an air hose. Air shall be supplied to the section and monitored so as not to exceed 5.0 PSIG. An independent air gauge and line shall be installed on the opposite plug to the air supply such that the gauge can be read at the ground surface. The air pressure shall be maintained between 4.0 and 3.5 PSIG for at least two minutes to allow air temperature to come to equilibrium with pipe walls. The air supply shall then be disconnected and the air pressure allowed to decrease to 3.5 PSIG. At 3.5 PSIG, the time shall be measured for the pressure to drop to 2.5 PSIG. The following table shows the allowable time for a loss of 1.0 PSIG at an average pressure of 3.0 PSIG.

Pipe Diam. inches	Min. Time, Min:Sec	Length For Min. Time, Ft.	Time for Longer Lengths, Sec.	Specification time for Length (L) Shown, min:sec							
				100ft	150ft	200ft	250ft	300ft	350ft	400ft	450ft
4	3:46	597	0.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	0.854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53
36	34:00	66	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46

If the actual time for a loss 1.0 PSIG is less than the allowable time shown in the above table, the contractor shall determine the source of leakage and effect all repairs necessary to make the pipe sufficiently airtight. The section shall be retested until the allowable time is met or exceeded.

3.2.8. Pipes installed at slopes less than those shown on the drawings shall be reinstalled to the slopes as shown or the contractor shall provide a design report prepared and sealed by a professional engineer showing the theoretical capacity and velocity of the pipe "as installed" based on total energy head and the pipe manufacturer's "N" value. The theoretical "as installed" velocities and capacities shall be submitted to the engineer for evaluation. If the "as installed" theoretical capacity and velocity meet the design requirements the line will be acceptable.

3.2.8.1. If the "as installed" theoretical capacity and velocity do not meet the design requirements, the contractor shall conduct a flow test to determine the velocity and capacity with the pipe flowing one-half full. If the actual velocity and capacity meet the design requirement, the line is acceptable, otherwise the line shall be re-laid to the slope as shown on the drawings.

**** END OF SECTION ****

SECTION 02820

CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Installation of fence framework, fabric, and accessories; excavation for post bases; concrete foundations for posts and center drop for gates; and manual gates and related hardware as shown on the plans and specified herein.

1.2 REFERENCES

- A. ASTM A53 - Specification for Pipe, Steel, Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless
- B. ASTM A123 - Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products
- C. ASTM A153 - Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- D. ASTM A307 - Specification for Carbon Steel Externally Threaded Standard Fasteners
- E. ASTM A392 - Zinc-Coated Steel Chain-Link Fence Fabric
- F. ASTM A428 - Test Method for Weight of Coating on Aluminum-Coated Iron or Steel Articles
- G. ASTM A491 - Aluminum Coated Fabric Wire
- H. ASTM A569 - Steel, Carbon (0.15 Maximum Percent), Hot-Rolled Sheet and Strip Commercial Quality
- I. ASTM A653 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-dip Process
- J. ASTM A792 - Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-dip Process
- K. ASTM A824 - Metallic Coated Steel Marcellled Tension Wire for Use with Chain Link Fence
- L. ASTM B429 - Aluminum-Alloy Extruded Structural Pipe and Tube
- M. ASTM C94 - Ready Mixed Concrete
- N. ASTM F567 - Practice for Installation of Chain Link Fence
- O. ASTM F668 - Poly (Vinyl Chloride) (PVC) Coated Steel Chain Link Fence Fabric
- P. ASTM F900 - Industrial and Commercial Swing Gates
- Q. ASTM F934 - Standard Colors for Polymer-Coated Chain Link Fence

- R. ASTM F1043 – Strength and Protective Coatings on Metal Industrial Chain Link Fence Framework
- S. ASTM F1083 – Pipe, Steel, Hot-dipped Zinc-Coated (Galvanized) Welded, for fence Structures
- T. ASTM F1184 – Industrial and Commercial Horizontal Slide Gates
- U. CLFMI (Chain Link Fence Manufacturers institute) – Product Manual

1.3 SUBMITTALS

- A. Shop drawings showing the plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates and a schedule of components.
- B. Data indicating compliance with these specifications for the fabric, posts, accessories, fittings and hardware.

1.4 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Supply material in accordance with CLFMI – Product Manual.
- C. Perform installation in accordance with ASTM F567.
- D. Furnish a 10-year factory warranty against corrosion and rust for the entire fencing system.

1.5 PRODUCT HANDLING

- A. Deliver fence fabric and accessories in packed cartons or firmly tied rolls.
- B. Packages shall be labeled with the manufacturer's name.
- C. Store fence fabric and accessories in a secure and dry place.

PART 2 PRODUCTS

2.1 MATERIALS

- A. General - Material furnished shall be new and first quality and shall not have been painted. Steel shall be copper bearing, containing not less than 0.2% pure copper. Materials are to be galvanized, then PVC coated – green color per Drawings.
- B. Framing (Steel): ASTM A569; hot rolled steel strip, cold formed to pipe configuration, longitudinally welded construction, minimum yield strength of 50 ksi; coating conforming to ASTM F1043 Type B on pipe exterior and interior.
- C. Fabric Wire (Steel): ASTM F668 PVC coated.
- D. Concrete: ASTM C94; Air Entrained Portland Cement, 3,500 psi strength at 28 days, 3 inch slump; ¾ inch nominal sized coarse aggregate.

2.2 COMPONENTS

- A. Line Posts: 2.5 inch diameter.
- B. Corner and Terminal Posts: 3 inch.
- C. Gate Posts: 4 inch diameter.
- D. Top, Bottom and Brace Rail: 1 5/8-inch diameter, plain end, sleeve coupled.
- E. Fabric: 2 inch diamond mesh interwoven wire, 9 gage thick, top selvage knuckle end closed, twisted tight, bottom selvage twisted tight, knuckle end closed.
- F. Tension Wire: 6 gage thick steel, single strand, ASTM A824.
- G. Tie Wire: Aluminum alloy steel wire.
- H. Fastener Hardware: ASTM A307

2.3 ACCESSORIES

- A. Caps: Cast steel galvanized; sized to post diameter, set screw retainer.
- B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; galvanized steel, color as fabric.
- C. Gate Hardware: Fork latch with gravity drop, center gate stop and drop rod, mechanical keepers; two 180 degree gate hinges for each leaf and hardware for padlock. Hinges shall be non lift-off design.

2.4 GATES

- A. Gate Types, Opening Widths and Directions of Operation: As indicated on Drawings.
- B. Fabricate gate frames from 1.9 inch outside diameter pipe weighing 2.72 lbs/l.f. unless note otherwise.
- C. Factory assemble gates.
- D. Gates are to be the same height as the fence unless noted otherwise.
- E. Conform to requirements specified for PVC coated steel chain link fence except that PVC coated aluminum alloy framing conforming to ASTM B429 may be used.
- F. Design gates for operation by one person.

2.5 CANTILEVERED SLIDING GATES

- A. Fabricate gate leaf frames and tracks of aluminum conforming to ASTM B429 alloy 6063-T6 or as required to meet performance requirements of ASTM F1184 and specified performance requirements.
- B. Frame Members: Minimum 2 inch 0.91 lb/ft aluminum tubing welded assembly forming rigid, one piece unit.
- C. Install fabric securely stretched and held in center of tubing.
- D. Brace cantilever overhang frames with 3/8 inch brace rods. For gate leaf sizes greater than 23 feet, fabricate with additional lateral support rail welded adjacent to top and bottom horizontal rails.

- E. Provide minimum overhang for each leaf opening size as follows:

Opening	Overhang
12'-0"	6'

- F. Track: Combined, integral track and rail.
- G. Rail: Aluminum extrusion; minimum total weight of 3.72 lb/ft; designed to withstand reaction load of 2,000 lbs.
- H. Roller Track Assembly: Two swivel type, zinc, die cast trucks having four, sealed lubricant ball bearing wheels minimum 2 inches diameter by 9/16 inches width designed for same reaction load as rail. Provide two side-rolling wheels for each gate leaf to maintain alignment of truck in track.
- I. Fasten trucks to post brackets by minimum 7/8 inch diameter, 1/2 inch shank ball bolts.
- J. Provide galvanized steel guide wheel assemblies consisting of two rubber wheels of minimum 4 inch diameter with oil-impregnated bearings for each supporting post.
- K. Attach guide wheel assembly to post so bottom horizontal member rolls between wheels and permitting adjustment to maintain plumb gate frames and proper alignment.

2.6 FINISHES

- A. Components and Fabric: Vinyl coating, color selected by the owner, in accordance with ASTM F934 over galvanized coating to ASTM A53; ASTM A123; ASTM A153, ASTM A653 for components; ASTM A392 for fabric of 1.8 oz/sq ft galvanizing.
- B. Vinyl Components: color to match fabric.
- C. Hardware: Galvanized to ASTM A153, 1.8 oz/sq ft coating.
- D. Accessories: Same finish as framing, fabric.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install fence with posts vertical and components to line and grade shown on Drawings.
- B. Connect to existing fence at existing terminal post, new terminal post, existing line post converted to terminal post by installation of brace rails and brace rods.
- C. Install posts with 6 inch maximum clear opening from end posts to buildings, fences and other structures.
- D. Excavate holes for posts to diameter and spacing indicated on Drawings without disturbing underlying materials.
- E. Post holes shall have a plan diameter 12 inches greater than the post diameter and a minimum depth of 42 inches. Holes shall be clean and free of loose soil and debris.

- F. Line Post Footing Depth Below Finish Grade: ASTM F567, 4-feet.
- G. Corner, Gate and Terminal Post Footing Depth Below Finish Grade: ASTM F567, 4-feet.
- H. Set chain link fence posts in air-entrained 3,500 psi, $\frac{3}{4}$ inch concrete. Embed posts a minimum of 3'-0". Concrete shall be placed continuously in one operation and tamped or vibrated for consolidation.
- I. Center and align posts. Place concrete around posts and vibrate or tamp for consolidation. Verify vertical and top alignment of posts and make necessary corrections.
- J. Extend concrete footings 1-inch above grade, and trowel, forming crown to shed water.
- K. Fill gate posts with the above specified concrete prior to the installation of gates.
- L. Where solid rock is encountered line posts shall be set to a minimum depth of 12 inches, and end, corner, gate and intermediate post to a minimum of 18 inches in the solid rock. The hole shall have a minimum width or diameter 1 inch greater than the largest dimension of the post section to be set. After the post is set and plumbed the hole shall be filled with grout consisting of one part Portland cement and one part clean, well graded sand. The grout shall be thoroughly worked into the hole so as to leave no voids.
- M. Rails, Bracing, and Fabric - Concrete shall attain 75% of the 28 day strength before rails, tension wires and/or fabric is installed. A minimum of 7 days shall pass before installation of the above items. Fabric shall not be stretched and tensioned or gates hung until the concrete attains full strength. Fabric shall be installed with two inches clear space to finish grade.
- N. Set intermediate, terminal, gate, and posts plumb, in concrete footings with top of footing 2-inches above, 6-inches below finish grade. Slope top of concrete for water runoff.
- O. Line post spacing shall be a maximum of 10'-0" center to center.
- P. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail one bay from end and gate posts.
- Q. Corner and terminal posts are to be braced horizontally and diagonally. The braces are to extend over one adjacent panel. Changes in line of 30 degrees or more shall be considered as corners.
- R. Install top rail through line post tops and splice with 6-inch rail sleeves.
- S. On curves with a radius less than 500 feet the top rail shall be bent true to the curve.
- T. Install center, and bottom brace rail on corner gate leaves.
- U. Install framework, fabric, gates, and accessories in accordance with ASTM F567.
- V. Place fabric on outside of posts and rails.

- W. Install nuts for tension bands and hardware bolts on the side of the fence opposite the fabric.
- X. Stretch fabric between terminal posts or at intervals of 100-feet maximum, whichever is less.
- Y. Position bottom of fabric 2-inches above finished grade.
- Z. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15-inches on centers.
- AA. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.
- BB. Install bottom tension wire, strap stretched taut between terminal posts.
- CC. Support gates from gate posts. Do not attach hinged side of gate from building wall.
- DD. Install gate with fabric to match fence. Install three hinges on each gate leaf, latch, catches, drop bolt, foot bolts and sockets, torsion spring retainer, retainer and locking clamp.
- EE. Provide concrete center drop to footing depth and drop rod retainers at center of double gate openings.
- FF. Miscellaneous - Install nuts for tension bands and hardware bolts on the side of the fence opposite the fabric. Repair galvanized coating where damaged using hot-applied repair compound applied in accordance with the manufacturer's recommendations.
- GG. Repair damage to galvanized coating using hot-applied repair compound in accordance with the manufacturer's recommendations.

3.2 ERECTION TOLERANCES

- A. Maximum Variation From Plumb: ¼ inch in 8 feet.
- B. Maximum Offset From Indicated Position: 1-inch.

END OF SECTION

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PART 1 GENERAL

1.1. WORK INCLUDED

1.1.1. Requirements for permanent topsoiling, seeding and mulching.

1.2. SYSTEM DESCRIPTION

1.2.1. Furnish all labor, materials, and incidentals necessary and place topsoil, finish grade, fertilize, seed, mulch, and maintain all seeded areas within the limits of the working area as shown on the Drawings and all other areas disturbed by the Contractor's operations, as determined by the Engineer and in accordance with these Specifications.

1.3. APPLICABLE REGULATIONS

1.3.1. The Contractor shall comply with all applicable Federal, State and Municipal laws and regulations concerning vegetative measures for erosion and sediment control specifically to the publication "New York Guidelines for Urban Erosion and Sediment Control" dated March 1988, and revised October 1991, available from the USDA - Soil Conservation Service, 100 S. Clinton Street, Syracuse, New York 13261-7172, and the publication "New York Standards and Specifications for Erosion and Sediment Control", dated July 2016, available from the New York State Department of Environmental Conservation.

PART 2 PRODUCTS

2.1. MATERIALS

2.1.1. Topsoil

2.1.1.1. All topsoil required for the work shall be **screened** and provided by the Contractor. Topsoil shall not be muddy in nature, or have any debris, garbage, brick, asphalt, concrete, sticks or root material within it. Screened topsoil shall not have stones over ½" within it, and shall be weed free.

2.1.1.2. Topsoil shall consist of natural surface soil from well drained areas. **Topsoil shall be screened** and have an organic content of not less than 4%, and no greater than 6% by weight and shall have a pH value not lower than 6.0 nor higher than 7.0. Muck soil shall not be considered topsoil. Topsoil shall be typical of the locality, free from stones over ½" in diameter, roots, sticks, trash, peat, weeds, brick, asphalt, concrete, and sod. Topsoil shall have not less than 20% fine textured material (passing the No. 200 sieve), and not more than 15% clay, and not more than 10% gravel. Topsoil containing soluble salts greater than 200 ppm shall not be used.

2.1.1.3. Lime shall be ground limestone containing not less than 85% calcium and magnesium carbonates.

2.1.2. Fertilizer - Fertilizer shall be a commercial fertilizer, 5-10-10 grade. It shall be delivered to the site in the original unopened containers each showing the manufacturer's guaranteed analysis. Store fertilizer so that when used it shall be dry and free flowing.

2.1.3. Seed Mix - Seed shall be from the same or previous year's crop; each variety of seed shall have a percentage of germination not less than 90, a percentage of purity of not less than 85, and shall have not more than 0.5% weed content. All seed shall be furnished in sealed containers bearing the dealer's guaranteed analysis. Seed which has become wet, moldy, or otherwise damaged in transit or in storage is not acceptable. The mixture shall be a sun & shade mix, and consist of seed proportioned by weight % as follows:

	% By Weight
Kentucky Blue Grass	42
Perennial Ryegrass	33
Fine Fescue	35

Seed shall be applied at the rate of either 4 Lbs/1000 square feet depending on the mixture or as directed by the Engineer.

2.1.4. Mulch - Mulch shall consist of hay or straw containing no sticks larger than ¼" in diameter, stone, clay, or other foreign material which, in the judgment of the Engineer, will prevent matting down and eventual decay and decomposition of the mulch necessary for its complete effectiveness. Mulch must contain no growth inhibiting factors and be harmless to plant life, humans and animals. Hay shall be free of noxious weed seeds and shall not be undercured, hot must, moldy, caked, decayed, very dusty, or otherwise distinctly low quality. Straw shall consist of thoroughly threshed wheat, rye or oat stalks. Application rate shall be 2 to 3 tons/acre or as directed by Engineer.

2.2. SITE PREPARATION

- 2.2.1. As needed, install erosion control practices as outlined in Section "Erosion Control", Division 1 and as required in the "New York Standards and Specifications for Erosion and Sediment Control".
- 2.2.2. Complete filling, grading and compacting, as specified, allowing for the 4" of topsoil to be added.
- 2.2.3. Scarify all compact, slowly permeable, medium and fine textured subsoil areas. Scarify at approximately right angles to the slope direction in areas that are steeper than 5%.
- 2.2.4. Remove refuse, woody plant parts, stones over 1.5" in diameter, and other litter.

PART 3 EXECUTION

3.1. PLACING OF TOPSOIL

- 3.1.1. Topsoil shall be distributed to a uniform depth of 4" to 6" over the area. It shall not be placed when it is partly frozen, muddy, or on frozen slopes, or over ice, snow, or standing water puddles. Topsoil placed and graded on slopes greater than 5% shall be promptly fertilized, seeded, mulched and stabilized by "tracking" with suitable equipment. After the topsoil is placed and before it is raked to true lines and rolled, lime shall be spread evenly over the topsoil surface and thoroughly broadcast into the topsoil by heavy raking to a depth of 3".

3.2. PLACING OF FERTILIZER

- 3.2.1. Fertilizer shall be uniformly spread and immediately mixed with the upper 2" of topsoil.

3.3. PLACING OF SEED

- 3.3.1. Seed immediately after fertilizing at a rate of 4 lbs/1000 square feet or as directed by the Engineer. Seed shall be uniformly applied and lightly raked into the surface. Sow 50% of the seed in one direction and 50% in the perpendicular direction, then lightly roll the surface once and thoroughly water with a fine spray, taking care not to wash out the seed. No work of this kind shall be done when the air temperature is 32° F or less, or when the ground is frozen. The Contractor shall keep all seeded areas watered and in good condition, reseeding it if and when necessary.

3.4. MULCHING

- 3.4.1. Mulch materials as specified previously shall be furnished, hauled and evenly applied on all seeded areas or as designated by the Engineer. Mulch shall be applied at a rate of not less than 2 tons/acre nor greater than 3 tons/acre unless directed otherwise by Engineer. Mulch may be blown on slopes, the use of cutters in this equipment is permitted to the extent that at least 95% of the mulch in place on the slope shall be 6" or more in length. Mulch shall be applied the same day as seeding occurs.

3.5. WATERING

- 3.5.1. The Contractor is required to properly water areas on a daily basis, that have been seeded, to ensure growth. The contractor shall take what ever measures are necessary to provide water, including supplying of water through tanker trucks.

3.6. MAINTENANCE

- 3.6.1. The Contractor is required to repair or replace any seeding or mulching that is defective or becomes damaged for whatever reason. When, in the judgement of the Engineer, such defects or damages are the result of poor workmanship or failure to meet the requirements of the Specifications, then the cost of the necessary repairs or replacement shall be borne by the Contractor.

3.7. GUARANTEE

- 3.7.1. Grassed areas shall be maintained and guaranteed for a period of 2-years from actual seeding. The Contractor shall replace any seeding or mulching that is defective or becomes damaged during the guarantee period at no additional cost to the Owner.

**** END OF SECTION ****

SECTION 03100

CONCRETE FORMS AND ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Wood Form Material
2. Prefabricated Forms
3. Formwork Accessories
4. Vapor Barrier for Concrete Slab-on-Grade Construction

B. Related Sections

1. Section 03300 - Cast-in-Place Concrete
2. Section 15050 - Piping - General

1.2 REFERENCES

A. American Concrete Institute (ACI)

1. ACI 301 - Specifications for Structural Concrete for Buildings
2. ACI 318 - Building Code Requirements for Reinforced Concrete
3. ACI 347 - Guide to Formwork for Concrete

B. American Society for Testing and Materials (ASTM)

1. D4 - Standard Test Method for Bitumen Content
2. D6 - Standard Test Method for Loss on Heating of Oil and Asphaltic Compounds
3. D71 - Standard Test Method for Relative Density of Solid Pitch and Asphalt (Displacement Method)
4. D217 - Standard Test Method for Cone Penetration of Lubricating Grease
5. D1056 - Specification for Flexible Cellular Materials - Sponge or Expanded Rubber
6. D1751 - Standard Specifications for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)
7. D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
8. D4397 - Standard Specification for Polyethylene Sheeting for Construction, Industrial and Agricultural Applications

- C. American Association of State Highway and Transportation Officials (AASHTO)
 - 1. AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing
- D. National Institute of Standards and Technology (NIST)
 - 1. Voluntary Product Standard PS 1-95 - Construction and Industrial Plywood

1.3 SUBMITTALS

- A. Drawings showing schedule of placement, location of all construction joints and all control joints with methods of forming. Show the location and elevation of all sleeves, wall pipes and embedded items.
- B. Drawings showing sizes and materials for forms, form bracing, and form ties.
- C. Product Data on form release agent, permanent formwork and inserts.
- D. Samples for the following materials:
 - 1. Form ties (including cones) and spreaders
 - 2. Waterstops
 - 3. Compressible filler
 - 4. Premolded fillers
 - 5. Vapor barrier
 - 6. Other materials requested by the Engineer

PART 2 PRODUCTS

2.1 WOOD FORM MATERIALS

- A. Plywood: Class I High Density Overlay plyform, exterior grade, not less than 5 ply nor less than 5/8 inches thick conforming to Voluntary Product Standard PS 1-95
- B. Lumber: Douglas Fir species, No. 1 grade S4S with grade stamp clearly visible

2.2 PREFABRICATED FORMS

- A. Manufacturers:
 - 1. Symons Corporation, DesPlains, Illinois
 - 2. HICO Corporation, Bronx, NY
 - 3. Or equal
- B. Preformed Steel Forms: Minimum 16 gage (1.5 mm), tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearances of finished concrete surfaces; with clean, warp free, undented, ungouged, undamaged surfaces
- C. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearances of finished concrete surfaces

2.3 FORMWORK ACCESSORIES

A. Form Ties:

1. Ties for foundation walls shall be metal and designed with removable setback cones so that after removal of the projecting part, no metal shall remain within 1½ inches of the face of the concrete.
2. Flat bar snap ties for panel forms shall have plastic or rubber inserts with 1½ inch minimum depth to allow patching of tie hole after removal.
3. Setback cones shall be wood or plastic tapered cones 1 inch diameter and 1½ inches deep to allow filling and patching of the concrete surface after removal.
4. Common wire ties shall not be used.

B. Form Release Agent:

1. Non-staining and non-emulsifiable type which will not stain concrete or absorb moisture nor interfere with adherence of any material to be applied to concrete surfaces.
2. Form release agent for potable water tanks and structures shall be vegetable oil based and shall be NSF approved for use with potable water.

C. Corners:

1. Chamfered No. 1 Poplar wood strips; ¾ inch by ¾ inch; maximum possible lengths

D. Hydrophilic Strip Waterstop:

1. Hydrophilic waterstop shall be Hydrotite as supplied by Greenstreak or equal.
2. The waterstop shall be composed of chloroprene rubber and chloroprene rubber modified to impart hydrophilic properties.
3. The waterstop shall have a delay coating to inhibit initial expansion due to moisture present in fresh concrete.
4. The hydrophilic waterstop shall have the following performance requirements:

CHLOROPRENE RUBBER

Property	Test Method	Required Limits
Tensile Strength	ASTM D 412	1300 PSI min.
Ultimate Elongation	ASTM D 412	400% min.
Hardness (Shore A)	ASTM D 2240	50 +/- 5
Tear Resistance	ASTM D 624	100 lb/inch min.
Tensile Strength	ASTM D 412	350 PSI min.
Ultimate Elongation	ASTM D 412	600% min.
Hardness (Shore A)	ASTM D 2240	52 +/- 5
Tear Resistance	ASTM D 624	50 lb/inch
Expansion Ratio	Volumetric Change - Distilled Water @ 70° F	3 to 1 min.

5. The hydrophilic waterstop shall be adhered to the concrete surface in accordance with the manufacturer's requirements.
- E. Compressible Filler:
 1. Closed cell expanded neoprene, ASTM D1056, Grade No. 2C1, ozone and weather resistant
- F. Premolded Joint Filler:
 1. Buildings and Structures: Self-expanding cork, ASTM D1752, Type III; and Federal Specification HH-F-341-F, Type II, Class C; capable of one directional swelling up to 140% of its original thickness
 2. Sidewalks: Asphalt impregnated, ASTM D1751, 3/4 inch thick unless otherwise shown on the Drawings
- G. Vapor Barrier:
 1. 10 mils thick polyethylene sheeting conforming to ASTM D4397

PART 3 EXECUTION

3.1 GENERAL

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with Drawings.
- B. Review all work prepared by others to receive work of this Section and correct any defects affecting installation. Commencement of work by the Contractor will be construed as complete acceptance of preparatory work by others.
- C. Handle and store materials separately in such manner as to prevent intrusion of foreign matter, segregation, or deterioration. Do not use foreign materials or those containing frozen material. Remove improper and rejected materials immediately from point of use. Cover materials and accessories during construction period.

3.2 VAPOR BARRIER

- A. Except where membrane waterproofing is required, all interior concrete slabs-on-grade shall be placed on a continuous vapor barrier.
 1. Place 4 inches of fine granular fill over the vapor barrier to act as a blotter for the concrete slab.
 2. Vapor barrier joints shall be lapped 6 inches and sealed with compatible waterproof pressure-sensitive tape.
 3. Patch all punctures and tears.

3.3 EARTH FORMS

- A. Earth forms are not permitted.

3.4 FORM PREPARATION

- A. Coat contact surfaces of forms with a form release agent prior to form installation.

- B. Thoroughly clean steel forms between uses using high pressure water or jet or sand blasting to remove all mill scale, concrete laitance or other ferrous deposits from the contact surfaces of the forms.
- C. Before re-use of wood forms, thoroughly clean form contact surfaces, repair damaged areas and remove projecting nails. A partial or complete steel lining on wood sheathing or plywood will not be allowed.

3.5 ERECTION - FORMWORK

- A. Erect formwork, shoring and bracing to achieve design requirements of ACI 301 and the following additional requirements:
 - 1. Variation from plumb in the lines and surfaces of columns, piers, and in walls
 - a. In any 10 feet of length $\frac{1}{4}$ inch
 - b. Maximum for entire length $\frac{1}{2}$ inch
 - 2. Variation of the linear building lines from established position in plan and related positions of columns, walls and partitions:
 - a. In any bay $\frac{1}{4}$ inch
 - b. In any 20 foot of length $\frac{1}{4}$ inch
 - c. Maximum for the entire length $\frac{1}{2}$ inch
 - 3. Variation in cross-sectional dimensions of columns and beams and in thickness of slabs and walls:
 - a. Minus $\frac{1}{8}$ inch
 - b. Plus $\frac{1}{4}$ inch

3.6 JOINTS

- A. Construction and expansion joints indicated on the Drawings are mandatory and shall not be omitted.
- B. Use premolded joint filler at expansion joints unless otherwise noted.
- C. Form construction and expansion joints with a keyway and waterstop unless otherwise shown on the Drawings. The depth of the keyway shall be approximately 3 inches, and the minimum width of keyway shall be one-third the width of the wall or floor section unless otherwise shown on the Drawings. The maximum width of any key at a joint with waterstop shall be 3 inches. Construction and expansion joints are to be formed in place prior to notifying the Engineer for inspection of formwork.
- D. Where joints other than those shown are required, obtain approval prior to installation.
- E. For slab-on-grade construction (welded wire fabric reinforcement only) with large floor areas where construction joints are not shown, the maximum area per section is approximately 600 square feet, but will not limit the number of sections which may be placed at one time. For structural slabs reinforced with deformed bars where construction joints are not shown on the Drawings, the maximum area will be approximately 900 square feet. Slab dimensions between construction joints for floor

areas shall be as "square" as possible, but the length shall not exceed 1.5 times the width under any circumstances.

- F. For slab-on-grade construction, a preformed metal keyway with removable top strip may be substituted for intermediate construction joints unless otherwise shown on the Drawings.
- G. Joints shall be straight and true. Brace all slab bulkheads adequately to keep joints straight. Construction joints in slabs exceeding 5 inches in thickness shall be keyed using a keyway nominally 3-5/8 inches by 1/3 of the slab thickness but not greater than 3 inches wide.
- H. Wall construction joints shall be placed as shown on the Drawings, or the maximum spacing of vertical construction joints in walls shall not exceed 40 feet where construction joints are not shown.
- I. Joints not indicated or specified shall be placed to least impair strength of structure and shall be subject to approval of the Engineer.

3.7 INSERTS, EMBEDDED ITEMS, AND OPENINGS

- A. Provide formed openings where required for items to be embedded in or passing through concrete work in conformance with requirements of ACI 318, paragraph 6.3, "Conduits and pipes embedded in concrete."
- B. Locate and set in place items that will be cast directly into concrete.
- C. Coordinate work of other Sections in forming and placing openings, slots, sleeves, wall pipes, anchor bolts and other inserts. Wall pipes and sleeves shall conform to the requirements of Section 15050.
- D. Install accessories in accordance with manufacturer's instructions, straight, level and plumb. Ensure items are not disturbed or damaged during placement of concrete.
- E. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at the bottom of forms to allow flushing water to drain.
- F. Close temporary openings with tight fitting panels, flush with inside face of forms and neatly fitted so that joints will not be apparent in exposed concrete surfaces after concrete placement.

3.8 WATERSTOPS

- A. Hydrophilic waterstop shall be installed in accordance with the manufacturer's recommendations.
- B. The Engineer shall approve of the proposed location, concrete cover and steel reinforcement prior to the installation of any Hydrophilic waterstop.
- C. The Hydrophilic waterstop ends shall be cut square or mitered at corners. In addition, all waterstop splices shall be sealed in accordance with the manufacturer's requirements.

3.9 ACCESSORIES

- A. Install form liners into formwork prior to placement of reinforcing steel or concrete in compliance with the manufacturer's requirements.
- B. Neoprene waterstop washers are to be placed along the form ties or inside ties so they are in the middle third of the thickness of the structural element.

3.10 FORM REMOVAL

- A. The Contractor shall be responsible for damage resulting from form removal. Forms and shoring for structural slabs or beams shall remain in place in accordance with requirements in ACI 301. Form removal shall also conform to the requirements specified in Section 03300.

3.11 INSPECTION

- A. The Engineer shall be notified when the forms are complete and ready for inspection at least thirty-six hours prior to the proposed concrete placement.
- B. Failure of the forms to comply with the requirements specified herein, or to produce concrete complying with requirements of these Specifications, shall be grounds for rejection of that portion of the concrete work. Rejected work shall be repaired or replaced at no additional cost to the Owner. Such repair or replacement shall be subject to the requirements of these Specifications and approval of the Engineer.

END OF SECTION

SECTION 03200**CONCRETE REINFORCEMENT****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes
 - 1. Reinforcing Steel Bars
 - 2. Welded Wire Fabric
 - 3. Reinforcing Accessories
- B. Related Sections
 - 1. Section 03100 - Concrete Forms and Accessories
 - 2. Section 03300 - Cast-in-Place Concrete
 - 3. Section 03485 - Precast Concrete Structures

1.2 REFERENCES

- A. The New York State Building Code, latest edition.
- B. American Concrete Institute (ACI)
 - 1. ACI 117 - Standard Tolerance for Concrete Construction and Materials
 - 2. ACI 301 - Specifications for Structural Concrete for Buildings
 - 3. ACI 315 - Details and Detailing of Concrete Reinforcement
 - 4. ACI 318 - Building Code Requirements for Reinforced Concrete, American Concrete Institute
 - 5. ACI 350R - Environmental Engineering Concrete Structures
 - 6. ACI SP-66 - Detailing Manual
- C. American Society for Testing and Materials (ASTM)
 - 1. A185 - Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
 - 2. A615 - Specification for Deformed and Plain Billet - Steel Bars for Concrete Reinforcement
 - 3. A675 - Specifications for Steel Bars, Carbon, Hot Wrought, Special Quality, Mechanical Properties
- D. American Welding Society (AWS)
 - 1. D1.4 Structural Welding Code - Reinforcing Steel
- E. Concrete Reinforcing Steel Institute (CRSI)

1. CRSI 63 - Recommended Practice for Placing Reinforcing Bars
2. CRSI 65 - Recommended Practice for Placing Bar Supports, specifications and nomenclature

1.3 SUBMITTALS

- A. Provide shop drawings in accordance with the recommendations of ACI 315, "Details and Detailing of Concrete Reinforcement" and show the following: elevations, dimensions of concrete work with specified reinforcement clearances; ledges, brackets, openings, sleeves or other items furnished by other Sections, where interference with reinforcement may occur; bending diagrams; assembly diagrams; splices and laps of reinforcement; temperature and shrinkage reinforcement; construction joint reinforcement and shape; dimensions, grade designations, and details of reinforcement and accessories. Show dowels with concrete work to be placed first. Shop drawings shall be drawn to scale.
- B. Bar Bending Details - The bars shall be referenced to the same identification marks shown on the placement drawings. Bars to have special coatings and/or to be of special steel or special yield strength are to be clearly identified.
- C. Prior to delivery of reinforcing steel or concrete to job site, submit certified mill test reports of reinforcing steel and cement (including names and locations of mills and shops, and analyses of chemical and physical properties), properly correlated to concrete to be used in this project.

1.4 DELIVERY, HANDLING AND STORAGE

- A. Reinforcing steel shall be substantially free from mill scale, rust, dirt, grease, or other foreign matter.
- B. Reinforcing steel shall be covered and stored off the ground, protected from moisture, and kept free from dirt, oil, or other foreign matter.

PART 2 PRODUCTS

2.1 REINFORCING STEEL BARS

- A. Reinforcing steel bars shall be newly rolled billet steel conforming to ASTM A615, Grade 60.
- B. Minimum yield strength shall be 60,000 psi.
- C. Where reinforcing steel bars are called for to be grouted into existing concrete, the anchorage shall develop an allowable bond strength equal to 24,000 psi times the cross section area of the bar, or an ultimate strength equal to the tensile strength of the bar.
 1. For installations in non-submerged concrete with an ambient temperature greater than or equal to 40 degrees Fahrenheit, the epoxy adhesive shall be, Hilti HIT_HY 200, Simpson SET-XP, Powers PE 1000+ or approved equal.
 2. For installation in wet or submerged concrete with an ambient temperature greater than or equal to 40 degrees Fahrenheit, the epoxy adhesive shall be Hilti HIT RE-500SD, Simpson ET-HP, Powers Pure 110+ or approved equal.
 3. For installation in concrete below 45 degrees Fahrenheit the epoxy adhesive shall be Hilti HIT ICE, Simpson AT-XP or equal.

2.2 WELDED WIRE FABRIC

- A. Welded wire fabric shall conform to ASTM A185

2.3 REINFORCEMENT ACCESSORIES

- A. Reinforcement accessories shall conform to Product Standard PS7-766, National Bureau of Standards, Department of commerce, Class C, as produced by Dayton Superior Corporation; R.K.L. Building Specialties Co., Inc. or equal approved by the Engineer.
- B. Reinforcement accessories shall include spacers, chair ties, slab bolsters, clips, chair bars, and other devices for properly assembling, placing, spacing, supporting, and fastening reinforcement.
- C. Tie wire shall be of sufficient strength for all intended purpose, but not less than No. 18 gauge. Metal supports shall be of such type as not to penetrate surface of formwork and show through surface of concrete.
- D. Accessories touching interior formed surfaces exposed to view shall have not less than 1/8 inch of plastic between metal and concrete surface. Plastic tips shall extend not less than 1/2 inch up on metal legs.
- E. Individual and continuous slab bolsters and chairs shall be of type to suit various conditions encountered and must be capable of supporting 300 pound load without damage or permanent distortion.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Review all work prepared by others to receive work of this Section. Commencement of work will be construed as complete acceptance of preparatory work by others.

3.2 PREPARATION

- A. Notify the Engineer prior to the start of any phase of the reinforcing work so as to provide the opportunity to inspect the work. Such notification shall be made at least 24 hours in advance of reinforcement placements and at least 36 hours in advance of other inspections (forms, etc.).

3.3 REINFORCING BAR FABRICATION

- A. Fabrication of reinforcement shall be in accordance with the recommendations of CRSI.
- B. Reinforcing bars shall be cold bent and shall not be straightened or re-bent. Bars shall not be field bent unless approved by the Engineer.
- C. Reinforcing bars shall be bent around a revolving collar having a diameter of not less than that recommended by the CRSI.
- D. Reinforcing bar ends that are to be butt spliced or threaded, shall have the applicable end saw-cut. Such ends shall terminate in flat surfaces at a right angle to the axis of the bar.

- E. Where reinforcing bars are called for to be welded, the welding shall conform to AWS D1.4 Structural Welding Code - Reinforcing Steel.

3.4 INSTALLATION

- A. Reinforcement shall be placed in accordance with requirements of CRSI -63 - "Recommended Practice for Placing Reinforcing Bars" and CRSI 65, "Recommended Practice for Placing Bar Supports" and with further requirements below.
- B. Reinforcement shall be accurately placed in accordance with Contract Documents and shall be firmly secured in position by wire ties, chairs, spacers, and hangers, each of type approved by the Engineer. For slabs, grade beams, etc. where concrete is poured on grade, use additional setup bars and concrete brick to provide required cover over reinforcement.
- C. Bending, welding or cutting reinforcement in field in any manner other than as shown on Drawings, is prohibited, unless specific approval for each case is given by the Engineer.
- D. Reinforcement shall be continuous through construction joints unless otherwise indicated on Drawings.
- E. Reinforcement shall be spliced only in accordance with requirements of Contract Documents or as otherwise specifically approved. Splices of reinforcement at points of maximum stress shall generally be avoided.
- F. Welded wire fabric shall lap 6 inches or one space plus 2 inches whichever is larger, and shall be wired together. Provide No. 4 set up bars spaced 30 inches on center for slabs-on-grade or elevated slabs with composite decks.
- G. Proceed with installation of embedded items, and reinforcement, but do not place concrete into or around such items until the Engineer has approved work.

3.5 FIELD QUALITY CONTROL

- A. The Engineer shall have the right to postpone or stop concrete operations when in his judgment, reinforcement and embedded item installation has not been properly completed or the quality of construction will impair strength and durability or desired finished product. Costs arising from delays due to noncompliance will not be considered.
- B. Any material or workmanship that is rejected, either at the batch plant or at the site, shall be replaced promptly at no additional cost to the Owner.
- C. Before concrete is placed, reinforcement shall be free of excessive rust, dirt, oil, scale or other foreign matter that will destroy or reduce bond requirements. Reinforcement expected to be exposed to weather for a considerable length of time shall be painted with a heavy coat of cement grout. Protect stored materials so as not to bend or distort bars in any way. Bars that become damaged will be rejected.
- D. Before concrete is placed, check all installed reinforcement to ensure that it conforms to Contract Documents and approved Shop Drawings. Such checking shall be done only by qualified experienced personnel. In addition, the Engineer shall be notified at least 36 hours prior to concrete placement and given opportunity to inspect completed

reinforcement. Prior approval of Shop Drawings shall in no way limit the Engineer's right to require modifications or additions to reinforcement or accessories.

3.6 ADJUSTING

- A. Carry out corrections without delay as directed by the Engineer when construction operations indicate that requirements of Contract Documents or prudent construction practices are being or are about to be violated.

END OF SECTION

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SECTION 03300**CAST-IN-PLACE CONCRETE****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes
 - 1. Concrete Materials
 - 2. Admixtures
 - 3. Concrete Mix
 - 4. Colored, ferrosilicon, nonoxidizing, metallic-aggregate, dry-shake, surface hardener.
 - 5. Miscellaneous Concrete Materials
- B. Related Sections
 - 1. Section 03100 - Concrete Forms and Accessories
 - 2. Section 03200 - Concrete Reinforcement

1.2 REFERENCES

- A. The New York State Building Code, latest edition.
- B. American Association of State Highway and Transportation Officials (AASHTO)
 - 1. T 104 - Standard Method of Test for Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate
- C. American Concrete Institute (ACI)
 - 1. ACI 301-95 - Specifications for Structural Concrete for Buildings, (included as part of this specification)
 - 2. ACI 305 - Hot Weather Concreting
 - 3. ACI 306.1-90 - Standard Specifications for Cold Weather Concreting
 - 4. ACI 318-14 - Building Code Requirements for Reinforced Concrete
- D. American Society for Testing and Materials (ASTM)
 - 1. C33 - Standard Specification for Concrete Aggregates
 - 2. C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete specimens
 - 3. C40 - Standard Test Method for Organic Impurities in Fine Aggregates for Concrete
 - 4. C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete

5. C78 - Standard Test Method for flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
6. C87 - Standard Test Method for Effect of Organic Impurities in Fine Aggregate on Strength of Mortar
7. C94 - Standard Specification for Ready-Mixed Concrete
8. C109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. Cube Specimens)
9. C131 - Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
10. C138 - Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
11. C150 - Standard Specification for Portland Cement
12. C260 - Standard Specification for Air-Entraining Admixtures for Concrete
13. C293 - Standard Test Method for Flexural Strength of Concrete (Using Simple Beam With Center-Point Loading)
14. C330 - Standard Specification for Lightweight Aggregates for Structural Concrete
15. C494 - Standard Specification for Chemical Admixtures for Concrete
16. C496 - Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens
17. C535 - Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
18. C567 - Standard Test Method for Determining Density of Structural Lightweight Concrete
19. C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
20. C666 - Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
21. C881 - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
22. C882 - Standard Test Method for Bond Strength of Epoxy-Resin Systems used With Concrete By Slant Shear
23. C884 - Standard Test Method for Thermal Compatibility Between Concrete and an Epoxy-Resin Overlay
24. C989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars
25. D1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics

- 26. D1623 - Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics
- 27. D2126 - Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging

1.3 SUBMITTALS

- A. Submit a detailed list of concrete materials, and corresponding sources, proposed for use in concrete. If conveying concrete by pump is requested, related data regarding concrete materials, pumping device and methods shall be submitted for approval three weeks before such method is proposed for use. Tests for approval of concrete mixtures to be pumped shall be paid for by Contractor. Provide certified mill test reports of cement, (including names and locations of mills and shops, and analyses of chemical and physical properties), properly correlated to concrete to be used.
- B. Submit Methods of Construction three weeks prior to starting work, describing methods, sequence of construction, manpower and type of equipment proposed for use for performing cast-in-place concrete work including special requirements for mat foundations where required. This submission shall not relieve Contractor of his responsibility for providing proper methods, equipment, workmanship, and safety precautions.
- C. Submit data and descriptive literature for concrete constituents including admixtures, aggregate tests, floor hardener, bond breaker, bonding agent, chemical grout foam and repair grout.
- D. Submit detailed methods proposed for curing and protection of concrete not less than 10 days prior to the placement of any concrete.
- E. Submit drawings showing details of any proposed corrective work.
- F. Submit a truck load ticket for every concrete delivery. Ticket information shall include batch time and date, weights of all constituents, quantity of admixtures, water added at the batch plant and moisture content of coarse and fine aggregates.
- G. Maintain an accurate daily record of the locations and quantity of concrete placed. Submit a certified copy of this record with each pay estimate.

1.4 QUALITY ASSURANCE

- A. Provide inspection of cast-in-place concrete work, and testing, including slump tests, air content, and standard compression testing. Materials and workmanship shall be subjected to inspection and testing in mill, shop and/or field by the Engineer. Such inspection and testing shall not relieve Contractor of his responsibility to provide his own inspection, testing, and quality control as necessary to furnish materials and workmanship in accordance with requirements of this Section.
- B. Provide source of and allow access to materials required to be sampled and tested.
- C. Sampling and testing required by the Engineer to determine if materials proposed for use in the project comply with Specification requirements shall be made prior to actual use of materials in project. Coordinate the work to ensure that materials are supplied, sampled, tested and approved so as not to delay progress of the work.

- D. Whenever source, quality, or characteristics of approved material changes, or indicates lack of compliance with requirements of Contract Documents, resubmit additional materials for sampling and testing until requirements are satisfied. Additional sampling, testing and inspection of materials and workmanship not originally conforming to requirements of Contract Documents shall be provided at no additional cost.
- E. Provide notification prior to the start of any phase of concrete placement work so as to provide the opportunity to inspect the work. Such notification shall be made at least 24 hours in advance of concrete placements and at least 36 hours in advance of other inspections (forms, rebars, etc.).
- F. Facilitate observation by the Engineer as well as inspection and testing by the concrete testing agency, and furnish the following:
 - 1. Information as to time and place of shipments of materials to plant and project site
 - 2. Representative sample pieces requested for testing
 - 3. Safe access to the work at all times to allow proper inspection of the work
 - 4. Full and ample means and assistance for sampling and testing materials and proper facilities for inspection of work in plant and at project site
 - 5. Covered box large enough to contain twenty-four standard concrete cylinders. At temperatures below 60°F., box shall be electrically heated and thermostatically controlled to maintain inside temperature of 60° to 80°F. Cylinders shall be placed in box immediately after molding and shall be covered with moist burlap until delivery to laboratory, 24 to 72 hours after molding.
 - 6. Access by the Engineer to the batch plant supplying the concrete at any time.
- G. Compression tests shall consist of one set of 4 cylinders for each test made, cured, and tested by testing laboratories during progress of job. 6 cylinders will be required for each test made with concrete mix containing fly ash or ground granulated blast furnace slag. One set of cylinders shall be taken for every 100 cubic yards of concrete or fraction thereof placed in any 1 day.
 - 1. 1 cylinder of each set shall be tested for 7-day compressive strength; 2 cylinders shall be tested for 28-day compressive strength. The remaining cylinder shall be tested for 56-day compressive strength if either one of the 28-day tests are below the specified strength, otherwise the 56-day test will be eliminated.
 - 2. For modified mix with fly ash or ground granulated blast furnace slag, 1 cylinder of each set shall be tested for 7-day compressive strength, 2 cylinders shall be tested for 28-day compressive strength and 2 cylinders shall be tested for 56-days compressive strength. The remaining cylinder shall be tested for 84-day compressive strength if either one of the 56-day tests are below the specified strength, otherwise the 84-day test will be eliminated.
 - 3. The Owner will provide and pay for the services of an approved testing laboratory to test the cylinders. The Contractor shall coordinate and schedule all concrete testing performed by approved agency.

4. Compression strength test of cylinders shall conform to ASTM Designation C39, latest revision. The testing laboratory will submit certified copies of the test results directly to the Engineer and the Owner within 24 hours after tests are made.
 5. Sampling, molding, curing and testing of cylinders shall conform to ASTM requirements. Specimens shall be cured under laboratory conditions. The Engineer may require additional cylinders to be cured under field conditions when unusual conditions may tend to reduce concrete strength.
 6. Report of tests shall include: name of project, date and location of concrete placement, design strength of concrete, mix data, slump, air content (if tested), compressive strength, age and condition of test cylinder, type of fracture, and type of curing.
- H. Slump test, to check consistency, shall be made from the sample used to mold cylinders. Additional slump tests may be taken of every batch delivered to job site.
- I. Tests for determination of air content shall be made as required to verify conformance with the specifications.
- J. The strength level of the concrete mix shall be considered satisfactory if both of the following criteria are satisfied:
1. Every arithmetic average of any three consecutive strength tests equals or exceeds the specified design strength.
 2. No individual strength test (average of two cylinders from the same test group) falls below the specified design strength by more than 500 psi when the specified design strength is 5000 psi or less or by more than 10 percent of the specified design strength when the design strength is more than 5000 psi.
- K. When tests of control specimens fall below these requirements, the Engineer will require 56 day or 84 day cylinder tests or core specimens taken from concrete in question and tested in accordance with ASTM C42. If these specimens do not meet strength requirements, the Engineer has the right to require additional curing, load tests, strengthening or removal and replacement of those parts of the structure which are unacceptable, and in addition, removal of such sound portions of structure as necessary to ensure safety, appearance, and durability of structure. Additional testing, load tests, strengthening or removal and replacement of parts or structure and any costs associated with delay of project shall be at no additional cost to the Owner.
- L. Any material or workmanship that is rejected, either at the batch plant or at the site, shall be replaced promptly at no additional cost to the Owner.
- M. If arrangements for corrections and/or replacements are not made within seven days after notice of rejection, the Owner has the right to have corrections and/or replacement made and charge cost thereof and any costs associated with delay of project against balance of monies withheld.
- N. Acceptance of work and admixtures at the batch plant shall not prevent final rejection at job site upon arrival or after it has been installed, if work is found to be defective.

- O. Portions of a structure which do not meet the requirements of the Contract Documents based on appearance or for any other aesthetic reason, shall be corrected or removed and replaced at no additional cost to the Owner.
- P. Work on new concrete structures shall conform to the requirements of ACI 306.1, Standard Specifications for Cold Weather Concreting, except as modified herein.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cement shall be American-made Portland Cement, free from water soluble salts or alkalis which will cause efflorescence on exposed surfaces. Portland Cement shall be Type II, ASTM C150 except in foundation mat where either Type II or Type IV, ASTM C150 may be used, as required, to meet heat gain requirements specified herein. Air entraining cements are prohibited.
- B. Use only one brand of cement for each type of cement throughout project. Contractor shall be responsible for whatever steps are necessary to ensure that no visual variations in color will result in exposed concrete and shall place on order and secure in advance a sufficient quantity of this (these) cement(s) to complete concrete work specified herein.
- C. Pozzolans and Blast Furnace Slag
 - 1. Fly Ash: Class F conforming to the requirements of ASTM C618
 - 2. Ground Granulated Blast Furnace Slag: Conform to ASTM C989
- D. Normal Weight Fine Aggregate
 - 1. Washed, inert, natural sand conforming to ASTM C33 and the following additional requirements:
 - a. Fineness Modulus 2.75 (plus/minus 0.25)
 - b. Clay lumps and friable particles – 3.0 percent maximum
 - c. Coal and lignite – 0.5 percent maximum
 - d. Organic Impurities (ASTM C40) – Organic Plate No. 2
 - e. Strength of Mortar (ASTM C87) – not less than 95 percent at 7 days
 - f. Soundness (AASHTO T-104) - 10 percent maximum loss (magnesium sulfate solution, five cycles)
- E. Normal Weight Coarse Aggregate:
 - 1. Well graded crushed stone or washed gravel conforming to ASTM C33 and the following additional requirements.
 - a. Material finer than No. 200 sieve – 1.0 percent maximum
 - b. Clay lumps and friable particles – 2.0 percent maximum
 - c. Chert (less than 2.40 specific gravity, saturated surface dry) – 3.0 percent maximum by weight.

- d. Sum of clay lumps, friable particles, and chert (less than 2.40 specific gravity, saturated surface dry) – 3.0 percent maximum by weight. This limitation only applies to aggregates in which chert appears as an impurity.
- e. Coal and lignite – 0.5 percent maximum
- f. Soundness - 18 percent maximum loss (magnesium sulfate solution, five cycles)
- g. Soundness - 10 percent maximum loss (sodium sulfate solution, five cycles)
- 2. Coarse aggregates shall not exceed 35 percent by weight "percentage of wear" as determined by the Los Angeles Abrasion and Impact Tests in ASTM C131 and C535.
- 3. Provide designated sizes noted in Table A for normal weight coarse aggregate to minimize shrinkage and cracking. The sizes shall also be chosen in accordance with ACI requirements for actual reinforcement clearances.
- F. Lightweight Fine and Coarse Aggregates: rotary kiln expanded shale conforming to ASTM C330 and as specified herein. Aggregate sizes shall include fine aggregate designated as "sand size", and coarse aggregate designated as graded 3/4 inch size or 3/8 inch size.
- G. Water shall be from approved source, potable, clean and free from oils, acids, alkali, organic matter and other deleterious material.

2.2 ADMIXTURES

- A. Mid-range water-reducing agent:
 - 1. Mid-range water-reducing agent shall be by same manufacturer as air-entraining agent.
 - 2. Daracem - 55 W.R. Grace & Co.
 - 3. Pozzolith 220N – BASF Admixtures, Inc.
 - 4. Eucon MR - Euclid Chemical Co.
 - 5. Or equal conforming to ASTM C494 Type A
- B. High-range water reducing agent:
 - 1. Daracem - 100 W.R. Grace & Co.
 - 2. Reobuild 1000 - BASF Admixtures, Inc.
 - 3. Eucon-37 - Euclid Chemical Co.
 - 4. Or equal conforming to ASTM C494 Type F
- C. Air-entraining agent:
 - 1. DAREX AEA - W.R. Grace & Co.

2. MB-VR or MB-AE90 - BASF Admixtures, Inc.
 3. Air-Mix - Euclid Chemical Co.
 4. Or equal conforming to ASTM C260
- D. Admixtures which retard setting of cement in concrete shall not be used without written approval of the Engineer. Admixtures causing accelerated setting of cement in concrete shall not be used.

2.3 CONCRETE MIX

- A. Development of concrete mix design and testing shall be by an independent ACI certified concrete testing agency engaged by and at the expense of the Contractor and shall conform to the following requirements:
 1. Select proportions of ingredients to meet the design strength and materials limits specified in Table B and to produce concrete having proper placability, durability, strength, appearance and other required properties. Proportioning shall also conform to the requirements in ACI 301 and ACI 318.
 2. The design mix shall be selected based on standard deviation data where a production facility has sufficient test records for a mix with essentially the same proportions.
 3. If sufficient test records are not available, (at least 30 consecutive strength tests or two groups of tests totaling at least 30 within the past 12 months), the design mix shall be developed using laboratory trial mixtures.
 4. Water content and cement content of concrete to be used in the work shall be based on a curve showing the relationship between water content, cement content, and 7 and 28 day compressive strengths of concrete made using proposed materials. Maximum water/cement (W/C) materials ratio or minimum cementitious materials content to be used in the proposed work shall be shown by the curve to produce the average strength required in Table C. Curves shall be determined by four or more points, each representing an average of at least three test specimens at each age, and shall have a range of values sufficient to yield desired data, including all compressive strengths required by the Contract Documents, without extrapolation. Design mix of concrete to be used in the work, as determined from the curve, shall correspond to the following test strengths (Table C) obtained in laboratory trial mixtures, but in no case shall resulting mix conflict with limiting values as specified in Table B.
 5. Sufficient materials for concrete mix design shall be furnished not less than five weeks before use. Duplicate small samples plainly and neatly labeled with source, where proposed to be used, date, and name of collector shall be provided and presented to the testing agency for permanent reference.
 6. All concrete is normal weight unless specifically designated otherwise with air-dry weight not to exceed 150 lbs. per cubic foot.
- B. Concrete in foundation mat shall conform to the requirements specified for massive concrete in ACI 301 and ACI 318 except as extended or modified by this Section.
- C. Limiting values shown in Table B apply for specific strengths of concrete with 3/4 inch coarse aggregates unless noted otherwise.
- D. In slabs and walls exposed to weather, concrete shall contain the approved air-entraining admixture as per manufacturers written instructions to provide entrained air by volume in the cured concrete between 4.5 and 7.5 percent.

- E. The approved water-reducing admixture shall be used in all concrete, in accordance with manufacturer's written instructions. Concrete mix with a 0.45 or lower water/cement ratio shall require a high range water reducer.
- F. Structural lightweight concrete shall have an air dry unit weight of 109 to 115 pounds per cubic foot as determined in accordance with ASTM C567, and a corresponding wet density not to exceed 120 pounds per cubic foot as determined in accordance with ASTM C138. Splitting tensile strength as determined by laboratory tests in accordance with ASTM C330 and ASTM C496 shall equal or exceed 330 pounds per square inch.
- G. Deviation from the approved mix design will not be allowed without written approval of the Engineer. Additional testing by testing agency associated therewith shall be at no additional cost to the Owner.

2.4 MISCELLANEOUS CONCRETE MATERIALS

- A. Grout shall be a ready-to-use, non-metallic, non-shrink aggregate product requiring only the addition of water at the job site. Grout shall be as manufactured by Five Star Products, Inc.; Euclid Chemical Company; Master Builders; or equal. Grout shall be easily workable and shall have no drying shrinkage at any age. Compressive strength of grout (2 inch by 2 inch cubes) shall not be less than 5000 psi at 7 days, and 7500 psi at 28 days.
- B. Dry-Shake Metallic Surface Hardener:
 - 1. Ready-to-use, colored, ferrosilicon, nonoxidizing, metallic-aggregate, dry-shake, surface hardener to add color and improve abrasion and impact resistance of concrete floors, where moisture or humidity may be present, when evenly distributed and finished over freshly leveled and floated concrete.
 - 2. Product and Manufacturer:
 - a. Acceptable Product: MasterTop 210COR (Formerly Lumiplate) by BASF.
 - b. Approved equal
 - 3. VOC Content: 0 lbs per gal (0 g/L).
 - 4. Color:
 - a. Natural

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify all work prepared by other trades to receive work of this Section and correct any defective installations.
- B. Verify cover requirements over all reinforcement.
- C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

- D. Verify site conditions to ensure that full access is available for placement of concrete.

3.2 HANDLING, STORAGE, AND PROTECTION OF MATERIALS

- A. Handle and store materials separately in such manner as to prevent intrusion of foreign matter, segregation, or deterioration. Do not use foreign materials or those containing frozen material. Remove improper and rejected materials immediately from point of use. Cover materials including steel reinforcement and accessories during construction period. Stockpile concrete constituents properly to assure uniformity throughout project.

3.3 JOINTS

- A. Construction and expansion joints indicated on Drawings are mandatory and shall not be omitted. Construction joints shall conform to the requirements of Section 03100 and the following:
 - 1. All horizontal construction joints are to be treated as follows: After placing of the concrete and after initial set of the concrete has taken place, the construction joint is to be cleaned off with a jet of water, air, or a jet of air and water mixed. The jet shall have sufficient force to clean off all loose concrete, scum, and laitance. The jet shall expose and clean off aggregate but shall not undercut or loosen the aggregate.
 - 2. Before placing new concrete against concrete already in place and hardened, the surface shall again be cleaned with a jet where practical.
 - 3. Where joints other than those shown are required, they shall be made at such locations as the Engineer may allow, and shall in no case impair the structural strength of the structure.
- B. Joints not indicated or specified shall be placed to least impair strength of structure and shall be subject to approval of the Engineer.

3.4 INSTALLATION OF EMBEDDED ITEMS

- A. Conform to requirements of ACI 318, paragraph 6.3, "Conduits and Pipes Embedded in Concrete", and as specified below.
- B. Install sleeves, furnished by other trades, at locations shown on the Drawings.

3.5 MIXING, CONSISTENCY, AND DELIVERY OF CONCRETE

- A. Concrete shall be ready-mixed, produced by a central batch plant. Hand or site mixing shall not be allowed. Constituents, including admixtures, except certain corrosion inhibitors and superplasticizers, shall be batched at the central batch plant. Admixtures shall be premixed in solution form and dispensed as recommended by the manufacturer.
- B. Central plant and rolling stock equipment and methods shall conform to Truck Mixer and Agitator Standard of Truck Mixer Manufacturer's National Ready-Mixed Concrete Association, ASTM C94, ASTM C685, and Contract Documents. Consistency of concrete at time of placement shall be as specified in Table D.
- C. Ready mixed concrete shall be transported to the site in watertight agitator or mixer trucks loaded not in excess of rated capacities. Discharge at site shall be within one

and one-half hours after cement is first introduced into the aggregates. Concrete with a temperature greater than 90°F. shall be rejected and removed from the site.

- D. During hot weather conditions as defined in ACI 306R (i.e., any of the following conditions: high ambient temperature, high concrete temperature, low relative humidity, increased wind velocity, high solar radiation), when the temperature of the concrete is 85°F or above, the time between the introduction of cement to the aggregates and discharge shall not exceed one hour. In addition, when the rate of evaporation on the surface of the concrete is expected to approach 0.2 lb/ft²/hr. (see chart in ACI 305R) special precautions shall be taken against the formation of plastic shrinkage cracking on the surface of the concrete after placement.
- E. During cold weather conditions, that is, any period when for more than three successive days the average daily outdoor temperature drops below 40°F, the concrete temperature at the time of placement shall be as specified in Table E.
- F. Central mixed concrete shall be plant mixed a minimum of five minutes. Agitation shall begin immediately after premixed concrete is placed in truck and shall continue without interruption until discharged. Transit mixed concrete shall be mixed at mixing speed for at least ten minutes immediately after charging truck followed by agitation without interruption until discharged. All transit mixed truck load ticket information shall include batch time, load weights of constituents, gallonage of water added and amounts of additives.
- G. Retempering of concrete, which has partially hardened by mixing with or without additional cement, aggregates, or water shall not be permitted.

3.6 PLACING CONCRETE

- A. Pumping of concrete will be permitted. If selected for any portion of the work, submit the list of equipment to be provided and mix design suitable for pumping for approval.
- B. Remove excess water and foreign matter from forms and excavations. Do not place concrete on frozen soil. Provide adequate protection against frost action during freezing weather.
- C. Do not place concrete having slump outside of allowable range.
- D. Transport concrete from mixer to place of final deposit as rapidly as practical by methods which prevent separation of ingredients and displacement of reinforcements, and which avoid rehandling. Do not deposit partially hardened concrete. When concrete is conveyed by chutes, equipment shall be of such size and shape to ensure continuous flow in chute. Flat (coal) chutes shall not be used. Chutes shall be of metal or metal lined and uniformly sloped. Slope shall not be less than 25 degrees nor more than 45 degrees from horizontal. Discharge end of chute shall be provided with baffle plate or spout to prevent segregation. If discharge end of chute is more than five feet above surface of concrete in forms, a spout shall be used. Concrete shall be lowered and maintained as near to the surface of deposit as practicable. When operation is intermittent, the chute shall discharge into hopper. The chute shall be thoroughly cleaned before and after each use and debris and any water shall be discharged outside of the forms. Concrete shall not be allowed to flow horizontally over distances exceeding 10 feet or dropped vertically over 6 feet.

- E. Place concrete in such a manner as to prevent segregation and accumulations of hardened concrete on forms or reinforcement above the grade of concrete being placed. Suitable hoppers and spouts with restricted outlets and tremies shall be used as required.
- F. Thoroughly consolidate each layer of concrete by rodding and vibrating using internal type mechanical vibrator. Vibration shall be done by experienced operators under close supervision and shall be carried on only enough to produce homogeneity and optimum consolidation without permitting segregation of constituents or "pumping" of air. Vibrators used for normal weight concrete shall operate at speeds of not less than 7,000 vpm and be of suitable capacity. Do not use vibrators to move concrete. Vibration shall be supplemented by spading to remove bubbles and honeycombs adjacent to visible surfaces. At least one vibrator shall be on hand for every 10 cubic yards of concrete placed per hour, plus one spare. Vibrators shall be operable and on site prior to starting concrete placement.
- G. Vertical lifts shall not exceed 36 inches. Vibrate completely through successive lifts to avoid pour lines. Vibrate first lift thoroughly until top of lift glistens to avoid stone pockets, honeycomb, and segregation.
- H. Deposit concrete continuously, and in layers of such thickness that no concrete will be deposited on concrete which has hardened sufficiently to cause formation of seams and planes of weakness within the section. If a section cannot be placed continuously between planned construction joints, as specified, field joints and additional reinforcement shall be introduced at the Contractor's expense to preserve structural continuity.
- I. Cold joints, particularly in exposed concrete, including "honeycombs", are unacceptable. If they occur in concrete surfaces exposed to view, the Engineer will require that entire section in which blemish occurs be removed and replaced with new materials at the Contractor's expense.
- J. When placing exposed concrete in walls or columns, strike corners of forms rapidly and repeatedly from outside along full height while depositing concrete and vibrating. Care shall be taken to thoroughly vibrate the concrete below and around wall penetrations.
- K. Chutes, hoppers, spouts, adjacent work, etc., shall be thoroughly cleaned before and after each use, and water and debris shall be discharged outside form.
- L. Sloped floors shall be placed with the use of pipe screeds for grade control. Pipe screeds shall be in place prior to placing the concrete for the floors.

3.7 CURING AND PROTECTION

- A. When concrete is placed at or below an ambient air temperature of 40°F. or whenever this temperature or lower values are likely to occur within 48 hours after placement of concrete, cold weather concreting procedures, according to ACI 306.1 and as specified herein, shall be followed. The entire area affected shall be protected by adequate housing or covering, and heating. No salt, chemicals or other foreign materials shall be used in the mix to lower the freezing point of concrete. No oil or kerosene fired heaters shall be utilized. Vent flue gases from combustion heating units to the outside of the enclosure.

- B. No frozen materials shall be used in batching concrete and any ice shall be removed from coming into contact with the concrete.
- C. Protect concrete work against injury from heat, cold, and defacement of any nature during construction operations.
- D. Concrete shall be treated and protected immediately after concreting or cement finishing is completed, to provide continuous moist curing above 50°F. for at least 7 days, regardless of ambient air temperatures.
- E. All concrete shall be cured immediately after finishing in accordance with the following requirements:
 - 1. Curing shall be accomplished by a continuous soaking process such as the use of soaker hose, sprinklers or accomplished through the use of a laminated reinforced asphalt impregnated paper which is non-staining or by use of plastic roll materials either of which shall be thoroughly wetted at least once a day or more often as required in very hot weather. Such paper or plastic shall be placed as soon as possible after finishing of concrete so that scarring of the surface will not occur. Paper or plastic shall be held in place on the surface of the concrete in such a manner and means as will not allow it to be blown off or otherwise dislodged from the concrete surface. Curing procedures shall be maintained continuously for a period of at least 7 days unless otherwise directed and approved by the Engineer.
 - 2. All methods of curing shall be subject to approval of the Engineer, and each method employed shall be practical and adequate for the curing required.
 - 3. Curing compounds in lieu of wet curing will not be allowed.
- F. Apply dry-shake metallic floor hardener in accordance with manufacturer's recommendations for new concrete surfaces. Apply the broadcast metallic aggregate at a rate of 2.0 lbs/sf. Finish, cure and protect the concrete slab in accordance with the manufacturers recommendation.
- G. Keep a permanent temperature record showing date and outside temperature during concreting operations. Thermometer readings shall be taken at start of work in morning, at noon, and again late in afternoon. Locations of concrete placed during such periods shall likewise be recorded in such manner as to show any effect temperatures may have had on construction. Copies of temperature records shall be distributed daily to the Engineer.

3.8 REMOVAL OF FORMWORK, SHORING AND RESHORING

- A. Forms and shoring shall not be removed until concrete has attained sufficient strength to support its own weight, construction loads to be placed thereon and lateral loads, without damage to structure or excessive deflection.
- B. With the exception of construction joint bulkheads and keyways, forms and supports shall remain in place for not less than the minimum time periods noted below.
 - 1. Unless specifically authorized by the Engineer, forms for vertical surfaces shall not be removed before the concrete has attained a strength of not less than 30

percent of the minimum allowable prescribed compressive strength nor not less than the minimum time period specified in Table F.

2. Unless specifically authorized by the Engineer, forms for horizontal surfaces shall not be removed before the concrete has attained a strength of not less than 60 percent of the minimum allowable prescribed compressive strength nor not less than the minimum time period specified in Table F.
 3. Definition of degree-days - Total number of days times mean daily air temperature at the surface of the concrete. For example, 5 days at temperature of 60°F. equals 300 degree-days. Days or fractions of days in which temperature is below 50°F. shall not be included in calculation of degree-days except where modified by Table E.
- C. Forms for construction joint bulkheads and keyways may be removed the following day, after the concrete pour. Extreme caution must be used to avoid damage to the concrete surface, keyway, and waterstop.
- D. Form removal shall be so performed that reshores are placed at same time as stripping operations where required, and that no area larger than one-fourth of a slab panel is unsupported at any time.
- E. Any test cylinders required to verify the specified minimum strengths for form removal shall be field cured under the same conditions as the concrete they represent. Such cylinders and testing shall be at the Contractor's expense.

3.9 FINISHING OF CAST-IN-PLACE CONCRETE

A. Upper Horizontal Surfaces

1. Horizontal surfaces not subjected to wear, such as tops of parapets, copings, walls, etc., shall be formed by placing an excess of material in the forms and removing or striking off such excess with a template, forcing the coarse aggregate below the surface of the mortar.
2. Horizontal surfaces shall be attained by striking off excess concrete and in no case shall concrete be added to the tops of walls, etc., once initial set has taken place.
3. The top of such surfaces shall be finished in a manner as required and dictated by the necessary appearance of the part being finished. For covered surfaces, a wood float finish will in most cases be sufficient. Steel troweling may be necessary where concrete is exposed to view and adjacent surfaces have a steel trowel finish. In other cases, a "broom" finish may be required.

B. Slab Surfaces

1. Exterior traffic bearing slab surfaces shall have a steel trowel finish and exterior slabs shall have a wood or magnesium trowel non-slip finish. The finish shall be accomplished by a procedure as follows, but shall be the Contractor's responsibility to produce a good and proper finish on all parts of the work:
 - a. "Steel Trowel Finish" - The surface shall be screeded and given a minimum of two trowelings using a steel trowel. The final troweling shall be done at a time when the concrete has set to a point where

troweling produces a ringing sound as the trowel is drawn across the surface. Where surface areas are large enough to permit their use, power finishing machines will be used. For all steel trowel finishes a fine textured dense surface shall be the final result and premature finishing will require additional troweling until such is the result.

- b. Surfaces requiring metallic- aggregate surface hardener: Apply the surface hardener to the tipping slab in accordance with the manufacturers instructions and at a rate of 2.0-2.5 lbs/sf .
2. For all of the finishing procedures described, the time element is important and something that must be determined during the progress of the work as conditions warrant. Normally, free water on the surface of concrete should not occur. Allow the concrete surface to dry before starting finishing operations. Do not, under any circumstance, add dry cement to wet areas in order to accelerate drying. Finishing and rubbing required for all parts of the work shall be done only by competent "Cement Finishers" trained for the work.

C. Formed Surfaces

1. Immediately after the end of the wet cure period, remove form ties and patch all tie-holes, rat holes, and other surface voids with a non-metallic, non-shrink grout, which most nearly matches the color and texture of the concrete surface. All protrusions shall be ground smooth with an approved mechanical grinder.

D. Surfaces Requiring Rub Finish

1. Rubbed finish of surfaces shall be provided on all poured interior and exterior vertical concrete surfaces and the underside of horizontal surfaces exposed to view, including all building and structure surfaces. Rubbing shall include but not be limited to:
 - a. The exterior face of all building foundation walls, platforms and the like, from the top of the walls to 6 inches below grade, stair risers, retaining walls, stair cheeks, and the like.
2. Surfaces requiring a rubbed finish shall, when completed, shall present a smooth, even textured surface and proper appearance. The Engineer shall be the sole judge of the acceptability of a rubbed finish. Cement utilized in rubbing shall be of the same type manufacturer and source as that used in batching the concrete. The following procedure shall be required and performed properly for all rubbed finish work, and this rubbing shall be repeated as many times as the Engineer deems it necessary in order to secure a satisfactory finish. For interior walls and ceilings of tanks, the finish shall only comply with the requirements in paragraphs a and b.
 - a. Immediately upon removal of the forms, snap all form ties and fill tie holes with non-shrink grout to a point slightly indented from the finished surface. Hand chip all air pockets and laitance covered holes greater than 1/4 inch. A mechanical grinder of a type approved by the Engineer shall then be used to remove any form marks, ribs, or bulges, or other protruding surface defects.
 - b. The surface shall then be wetted with clean water and a cement (4 parts), presifted fine sand (5 parts), and water grout shall be evenly applied utilizing a sponge float filling all exposed voids. The surface shall be rubbed with a burlap bag and allowed to thoroughly dry.
 - c. The surface shall again be wetted and the grout reapplied with the sponge float and again rubbed with burlap, removing all excess material.
 - d. To further fill the voids, rewet the surface and apply dry cement powder of the same manufacturer, type, and source used in batching the concrete. A burlap bag shall be used as the applicator. The excess cement powder shall be removed leaving only the voids filled. This procedure may have to be repeated to adequately fill all voids and present a uniform, smooth and even finished surface.
 - e. After the final rubbing is completed, the surface shall be thoroughly drenched and kept wet for a period of 7 days unless otherwise directed by the Engineer. No other cement powder, grout or other surface coating

will be allowed. Plastering of surfaces requiring a rubbed surface will NOT be tolerated.

3.10 REPAIRING OF HARDENED CONCRETE SURFACES

- A. Defective concrete and honeycombed areas shall not be patched unless examined and approval is given by the Engineer. After approval, areas involved shall be cut back to a minimum depth of 1 inch from the finished surface, or as otherwise directed, whichever is greater. Edges of areas to be repaired shall be cut square to a minimum depth of 3/4 inch. Feathered edges will not be allowed. Any voids or honeycomb around reinforcing steel shall be chipped away to provide at least 3/4 inch clearance all around to permit proper placement of repair concrete around the steel to the parent, sound concrete.
- B. Exposed surfaces shall be thoroughly cleaned of all mud, paint, grime, scum, laitance, organic matter, detritus, calcareous growth and other foreign matter by sand and water blasting or other acceptable means. Immediately after cleaning, the surface shall be checked by the Engineer for proper surface preparation, including fractured concrete or loose aggregate. Any such material shall be removed using pneumatic or hand tools. The final surfaces shall be thoroughly rinsed with clean water to remove remaining dirt and dust.
- C. Premoisten the prepared surface for at least 2 hours or reduce absorption of water by the parent concrete and to provide a reservoir for moist curing at the interface of the repair. The substrate should be saturated surface dry with no standing water. While the concrete surface is still damp, apply a thin 1/16 inch coat of neat cement slurry (mixed to the consistency of a heavy paste) with a bristle brush to provide a bond coat throughout the entire cavity of the repair. Before the slurry has dried or changed color, promptly install the repair concrete or dry-pack, as may be required or selected.
- D. For relatively small areas, ram repair concrete into this portion of the formed void. This concrete shall comprise a crumbly-dry 1-1-1.5 mixture of cement, concrete sand and pea gravel (or 3/4" gravel) mixed slightly damp to the touch (just short of "balling"). The "dry-pack" consistency of the concrete shall be zero slump, but moist enough so that when it is rodded and tamped until dense, an excess of paste will appear on the surface in the form of a spider web. In cases of unformed voids of thinner section, do not build-up repair in excess of a depth which will sag with the weight of the fresh mortar or concrete. Trowel smooth with heavy pressure.
- E. Large areas may be repaired with the normal concrete mix approved for use on the project.
- F. The concrete shall be of the driest possible consistency and mix composition so that it can be worked into the corners and angles of forms and around the reinforcement, without permitting the materials to segregate or free water to collect on the surface, due consideration being given to the methods of placing and compacting. Source and mixture of concrete shall be submitted for approval.
- G. Concrete shall be deposited continuously, or in layers of such thickness that no concrete will be deposited which has hardened sufficiently to cause the formation of seams and planes of weakness within the section. Concrete shall be thoroughly consolidated and trowelled dense, smooth and plane. Avoid premature and excessive trowelling that could cause sagging.

- H. Repair areas and adjacent parent concrete surfaces shall be treated immediately after finishing providing continuous moist curing without change in color for at least 7 days. Surfaces shall be covered with damp burlap and sealed with taped polyethylene. Membrane curing compounds shall not be used.
- I. Leave finished work and adjacent concrete surfaces in a neat, clean condition with no evidence of spillovers or staining.

3.11 CLEANING

- A. Concrete surfaces shall be cleaned of objectionable stains as determined by the Engineer. Materials containing acid in any form or methods which will damage the "skin" of concrete surfaces shall not be employed, except where otherwise specified.

Cast-In-Place Concrete Data Sheet
TABLE A
Coarse Aggregate Size

Concrete Section	Coarse Aggregate Size (inches)	ASTM C33 Size Number
All other concrete	3/4	67

TABLE B
Maximum Allowable Water/Cement Ratios

Compressive Strength (PSI)	Maximum Allowable Water/Cement Ratio ¹	Total Cementitious Material (lbs.) ^{2, 3}	
		Minimum	Maximum
4000	0.42	611	635
4500 ⁴	0.45	635	658
5000	0.40	651	676

¹Maximum; decrease if possible. This represents total water in mix at time of mixing, including free water on aggregates. Maximum W/C ratio for all water retaining structures and below grade structures (pump chambers, tunnels, etc.) shall be 0.42.

²Total cementitious material is for ¾" coarse aggregate mix - use lower quantity for larger coarse aggregate size mix. Fly ash may be substituted for up to 20 percent by weight of the total cementitious material in all classes of concrete. Ground granulated blast furnace slag may be substituted for up to 40 percent by weight of the total cementitious material in all classes of concrete. For all water retaining structures and below grade structures, fly ash shall be substituted for a minimum of 15 percent and a maximum of 25 percent of the total cementitious material, or ground granulated blast furnace slag shall be substituted for a minimum of 25 percent and a maximum of 40 percent of the total cementitious material.

³For concrete flatwork with a steel trowel finish, fly ash may be substituted for up to 10 percent by weight and ground granulated iron blast-furnace slag may be substituted for up to 25 percent by weight of the total cementitious material.

⁴For all structures exposed to freeze/thaw conditions, concrete exposed to freezing and thawing in a moist condition, and/or concrete exposed to deicing chemicals, use 4500 psi minimum design mix.

Cast-In-Place Concrete Data Sheet (Cont.)
TABLE C

Minimum Strength of Lab Mixes (PSI)

Design Strength	Trial Mix Strength 28 Days
4000	5200
4500	5700
5000	6200

TABLE D

 Concrete Slump⁵

Portion of Structure	Recommended (inches)	Maximum Range (inches)
Walls, Column, Beams	4	3-5
Slabs	3	2-4

⁵After addition of high range water reducer

TABLE E

Concrete Temperature During Cold Weather Conditions

Least Dimension of Section (Inches)	Minimum Temperature Of Concrete As Placed And Maintained During The Protection Period, °F	Maximum Gradual Decrease In Surface Temperature During Any 24 Hours After End Of Protection, °F
Less than 12	55	50
12 to less than 36	50	40
36 to less than 72	45	30
Greater than 72	40	20

Cast-In-Place Concrete Data Sheet (Cont.)
TABLE F

Minimum Degree Day Requirement for Form Removal

Form Use	Degree-Days
Walls and Vertical Surfaces	200

END OF SECTION

SECTION 03485**PRECAST CONCRETE STRUCTURES****PART 1 GENERAL****1.1 SUMMARY****A. Section Includes**

1. Pump Station Influent Sewer Manhole
2. Wet Wells
3. Valve Vaults

B. Related Sections

1. Section 02315 - Excavating, Backfilling and Compacting
2. Section 03300 - Cast-in-Place Concrete
3. Section 09900 - Painting
4. Section 11312 - Submersible Wastewater Pumps
5. Section 03100 - Concrete Forms and Accessories

1.2 REFERENCES**A. The New York State Building Code, most recent edition.****B. Precast Concrete Institute (PCI)**

1. MNL-116 - Manual for Quality Control for Plants and Production of Structural Precast Concrete Products.

C. American Concrete Institute (ACI)

1. ACI 301 - Specifications for Structural Concrete for Buildings, (included as part of this specification).
2. ACI 318 - Building Code Requirements for Reinforced Concrete.
3. ACI 350 - Environmental Engineering Concrete Structures.

D. American Society for Testing and Materials (ASTM)

1. ASTM A615 - Specification for Deformed and Plain Billet - Steel Bars for Concrete Reinforcement.
2. ASTM C33 - Standard Specification for Concrete Aggregates.
3. ASTM C39 - Standard Method of Testing for Compressive Strength of Cylindrical Concrete Specimens.
4. ASTM C150 - Standard Specification for Portland Cement.

5. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
6. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.

1.3 SUBMITTALS

- A. Submit to the Engineer, material specifications, and shop drawings for all materials specified and furnished under this Section. Submittals shall detail size and elevations of all structure penetrations, sleeve materials and sleeve elevations.
- B. The drawings show a generalized configuration for the precast concrete structures. Submittals shall include separate scaled, detailed drawings for each precast concrete structure.
- C. Submit to the Engineer shop drawings sealed by an Engineer registered in New York State, and material specifications for all materials specified and furnished under this Section. Submittals shall include: details of underground structures, accessories, fittings, connections, size and elevations of all structure penetrations, sleeve materials and sleeve elevations.
- D. Submit structural design calculations including verification of adequate anti-flotation features prepared and sealed by an Engineer registered in New York State.
- E. Submit manufacturer's data on structures, and associated specialty products.
- F. Submit Certificates of Compliance for reinforcing steel and concrete.

1.4 QUALITY ASSURANCE

- A. Design Criteria
 1. Precast concrete units shall be designed for all applicable dead loads, live loads, and lateral earth pressure, including H-20 truck wheel loading.
 2. Precast concrete unit shall be designed to resist buoyancy with a flood water table up to the ground surface elevation of 11 feet.
 3. Precast concrete units shall be designed for surcharge from adjacent structures (i.e. electrical building, generator, etc.) equivalent to a 150 PSF uniform lateral load applied over the full height of the wall.
 4. Precast unit shall be designed in accordance with ACI 318 and ACI 350.
 5. Comply with applicable requirements of American Society for Testing and Materials (ASTM) standards pertaining to construction and materials for precast structures.
 6. Pipe supports shall be supported by the precast walls, ceiling, or floor as indicated on the drawings.
- B. Fabricator Qualifications – Contractor shall employ a firm that has at least 5 years successful experience in fabrication of precast concrete units similar to units required for this project.
 1. Fabricator must be producer member of the Prestressed Concrete Institute (PCI) and participate in its Plant Certification Program.

- C. Contractor's Qualifications - Firms with at least 3 years of successful installation on projects with structures, similar to those required for project.
- D. Allowable Tolerances
 - 1. Dimensional and erection tolerances shall be in accordance with PCI MNL-116 or as modified herein.
 - 2. Compression test results shall be evaluated in accordance with ACI 214. Concrete strength level will be considered satisfactory if the average of all sets of 3 consecutive strength test results equal or exceed the specified compressive strength and no individual strength test results fall below the specific compressive strength by more than 500 psi.
- E. Source Quality Control
 - 1. One set of 4 compression test cylinders shall be made for each day's production for each type of precast Unit. Make compression test specimens in accordance with ASTM C31. Obtain concrete for specimens from actual production batch. Cure specimens using same methods used for curing precast units.
 - 2. 2 specimens shall be tested at 28 days for acceptance, one shall be tested prior to removing forms, and one shall be tested at seven days. Compression tests shall be conducted in accordance with ASTM C39. Do not remove precast units from forms unless strength tests have been completed and results are equal to, or greater than, minimum required values.
- F. Provide 7 day written notification to the Owner's Project Representative prior to casting the structures. The Engineer may sample the concrete and inspect reinforcement placement at the time of fabrication.
- G. The quality of all materials, the process of manufacture, and the finished sections shall be subject to inspection and approval by the Owner's Project Representative. Such inspection may be made at the place of manufacture, or on the work after delivery, or at both places, and the materials shall be subject to rejection at any time on account of failure to meet any of the Specifications requirements, even though samples may have been accepted as satisfactory at the place of manufacture. Material rejected after delivery to the job shall be marked for identification and shall be removed from the job at once. All materials, which have been damaged after delivery will be rejected, and if already installed, shall be acceptably repaired, if permitted, or removed and replaced, entirely at the Contractor's expense.
- H. At the time of inspection, the materials will be carefully examined for compliance with these Specifications, and with the approved manufacturer's drawings. All sections shall be inspected for general appearance, dimension, "scratch-strength," blisters, cracks, roughness, soundness, etc. The surface shall be dense and close-textured.
- I. Imperfections in sections may be repaired, subject to the approval of the Owner's Project Representative, after demonstration by the manufacturer that strong and permanent repairs result. Repairs shall be carefully inspected before final approval. Cement mortar used for repairs shall have a minimum compressive strength of 4,000 psi. at 7 days and 5,000 psi. at 28 days, when tested in 3 inch by 6 inch cylinders

stored in the standard manner. Epoxy mortar may be utilized for repairs subject to the approval of the Engineer.

- J. Plans and calculations for the precast structures shall be approved and stamped by a Structural/Civil Professional Engineer registered in New York State.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Equip and protect factory-fabricated product to prevent damage, including chipping and cracking during transportation, storage and handling. Do not install damaged units; replace and remove damaged units from project site at the Contractor's expense.
- B. Lift and support units only at designated lift points. Provide permanent lifting hooks on the top.
- C. Protect all lifting devices from rusting by applying red lead primer.
- D. Do not store units on soft ground.
- E. Provide setting diagrams and instructions as required for installation.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Portland Cement - ASTM C150, Type III.
- B. Aggregates - ASTM C33, and as herein specified. Provide aggregates from a single source for exposed concrete.
- C. Local aggregates not complying with ASTM C33, but which have shown by special test or actual service to produce concrete of adequate strength and durability, may be used when acceptable to Engineer.
- D. Water - Potable and free from foreign materials in amounts harmful to concrete and embedded steel.
- E. Air-Entraining Admixture - ASTM C260, not containing calcium chloride.
- F. Water-Reducing Admixture - ASTM C494, Type A, not containing calcium chloride.
- G. Calcium Chloride - Not permitted.

2.2 FORM MATERIALS

- A. Forms shall be of metal or wood. If unlined wood forms are used, they shall be of selected material with tongue and groove joints and shall be kept continuously wet to prevent shrinking and warping due to exposure to the elements. Non-staining form oil shall be used.
- B. Forms shall be sufficiently tight to prevent leakage of mortar.
- C. Forms shall be accurately constructed, mortar-tight, of sufficient strength to withstand pressures due to concrete placing operations and temperature changes.
- D. Coat surface of forms with bond-breaking compound before reinforcement is placed. Provide a commercial formulation form-coating compound that will not bond with, stain, nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces requiring bond or adhesion. Apply in compliance with manufacturer's instructions.

2.3 REINFORCEMENT

- A. Reinforcement shall be clean of loose rust and mill scale, earth and other materials, which reduce or destroy bond with concrete.
- B. Reinforcing steel shall be new billet steel conforming to ASTM Specification A615 (latest edition), Grade 60.
- C. Reinforcement shall be accurately positioned, supported, and secured against displacement by formwork construction, or concrete placement operations. Locate and support reinforcement by metal chairs, runners, bolsters, spacers and hangers, as required. Welding of reinforcement is strictly prohibited
- D. Place reinforcement to obtain at least the minimum coverage for concrete reinforcing protection. Minimum allowable cover shall be $\frac{3}{4}$ inch.
- E. Reinforcement shall be epoxy coated conforming to ASTM A775.

2.4 GROUT MATERIALS

- A. Non-metallic Shrinkage-Resistant Grout - Pre-mixed, non-metallic, non-corrosive, non-staining product containing selected silica sands, Portland cement, shrinkage compensating agents, plasticizing and water reducing agents. Compressive strength not less than 10,000 psi. at 28 days.
 - 1. Products - Subject to compliance with requirements, provide one of the following:
 - a. Eucocrete; Euclid Chemical Co.
 - b. Crystex; L&M Construction Chemicals
 - c. Masterflow 713; Master Builders
 - d. Five Star Grout; U.S. Grout Corp.
 - e. Upcon; Bostik Construction Products
 - f. or equal.

2.5 PROPORTIONING AND DESIGN OF MIXES

- A. Prepare design mixes for each type of concrete required.
- B. Design mixes may be prepared by independent testing facility or by qualified precast manufacturing plant personnel, at precast manufacturer's option.
- C. Produce standard-weight concrete consisting of the specified Portland cement, aggregates, admixtures, and water to produce the following properties.
 - 1. Compressive strength; 5,000 psi. minimum at 28 days.
 - 2. Air entrainment shall be 4.5% plus or minus 1%.
- D. Admixtures
 - 1. Use air-entraining admixture in concrete, unless otherwise indicated.

2. Use water-reducing admixtures in strict compliance with manufacturer's directions. Admixtures to increase cement dispersion, or provide increased workability for low-slump concrete, may be used.
3. Use amounts as recommended by admixture manufacturer for climatic conditions prevailing at time of placing. Adjust quantities of admixtures as required to maintain quality control.

2.6 FABRICATION

- A. General - Fabricate precast concrete units complying with manufacturing and testing procedures, quality control recommendations, and dimensional tolerances specified for the type of unit required.
- B. Clean reinforcement of the loose rust and mill scale, earth and other materials that reduce or destroy bond with concrete.
- C. Place concrete in a continuous operation to prevent formation of seams or planes of weakness in precast units. Thoroughly consolidate placed concrete by internal and external vibration without dislocation or damage to reinforcement and built-in items.
- D. Identification - Provide permanent markings to identify pickup points and orientation in structure, complying with markings indicated on final shop drawings. Imprint date of casting on each precast unit on a surface, which will not show in finished structure.
- E. Fabricate precast concrete units as detailed in accordance with approved erection drawings and to meet requirements of these specifications.
- F. Each precast module shall be provided with formed male and female joints to ensure accurate joint surfaces and tolerance for a watertight seal. All joints between adjoining precast modules shall be sealed when modules are set in the field utilizing a vulcanized butyl rubber compound sealant conforming to AASHTO M-198 (latest revision). Sealant shall be "Conseal CS-102" as manufactured by Concrete Sealants, New Carlisle, Ohio or equivalent.
- G. All surfaces of the precast structure shall be smooth, even and free from roughness, irregularities and other defects, and shall be suitable for receiving the interior and exterior finishes specified elsewhere herein.
- H. Sleeves for pipe and conduit penetrations shall be Schedule 40 aluminum or stainless steel. Surfaces in contact with concrete shall be bituminous coated. Sleeves shall be sized to accommodate compression bolted linked rubber sealing devices. Conduit shall be sealed watertight utilizing compression bolted conduit seals. Mechanical seals shall be "Link-Seal" as manufactured by Thunderline, or equivalent. Omni-sleeves are acceptable in lieu of linked rubber sealing devices. All pipe penetrations shall have mechanical seals located at the inside and outside face of any wall penetrations.
- I. A flexible pipe-to-structure connector shall be used.
 1. The flexible connectors shall be designed to provide a positive seal between the connector and the structure wall and between the connector and the pipe.
 2. The flexible boot shall be manufactured of EPDM synthetic rubber in accordance with ASTM C443 and C923 and shall be $\frac{3}{8}$ inch thick or greater.

3. The external bands shall be made entirely of 304 series non-magnetic stainless steel.
 4. The flexible connectors shall be provided with a wedge-type or toggle-type expander to secure the pipe in the structure opening.
 5. The flexible connectors shall meet the following criteria, in accordance with ASTM C923:
 - a. Shall not leak when subjected to a head pressure of 10 psi for 10 minutes.
 - b. Shall have the ability to deflect 7 degrees in any direction without leakage under the head pressure conditions described above.
 - c. Shall not leak when subject to a load of 150 lbs./in. pipe diameter and the head pressure conditions described above.
- J. The precast concrete structures shall be constructed to the lengths, widths and heights as shown on the Plans. The structures shall be designed to adequately and safely support all live and dead loads to which the structure will be subjected, and to withstand all conditions which may be encountered. Structural drawings and calculations shall be prepared, signed and sealed by a registered Professional Engineer in the State in which the structure is to be installed, and shall be included with the submittal by the Contractor.
1. Design calculations shall verify that the structure has been designed to withstand the burial depth, submergence due to flooding, anti-flotation, and the dead and live loads anticipated for the structure. The structures shall have adequate wall, floor and roof thickness and steel reinforcement sufficient for the depth of burial shown on the Plans.
 2. Roof slab/ceiling designs shall account for the loads imposed on the slab by the weight of pumps or other equipment that will be lifted from their positions for maintenance purposes by lifting hooks or other hoisting equipment installed in the slab.
- K. The precast concrete structures shall have minimum wall, floor and roof thickness of 6 inches. The structures shall have a design loading in accordance with AASHTO-HS20-44 and be constructed of 5,000 psi. 28 days strength concrete. Reinforcing steel shall be in accordance with ASTM A615 Grade 60 with a minimum of 1 inch of concrete cover.

2.7 ACCEPTABLE PRECAST STRUCTURE MANUFACTURERS

- A. Manufacturers - Subject to compliance with requirements, provide prefabricated unit of one of the following:
1. Arrow Concrete Products, Inc.
 2. American Precast Corp.
 3. Chase Precast
 4. Old Castle/Rotondo & Sons, Inc.
 5. Ditullio & Sons, Inc.

6. Utility Vault Co.
7. TRENWA
8. or equal

2.8 ACCESSORY PRODUCTS

A. Manhole Rungs

1. Manhole rungs shall be either of cast aluminum alloy 6061-T6, drop front design, 14 inches wide with an abrasive step surface or of steel reinforced, copolymer, polypropylene plastic. The manhole rungs shall conform to the requirements of OSHA.

B. Manhole Covers and Frames

1. Provide a manhole covers on the Pump Station Influent Sewer Manhole.
2. Manhole frames and covers shall comply with the detail shown on the Drawings.

C. Access Hatch

1. See Section 08310 for hatch requirements.
2. All Hatches shall be equipped with safety grating. Hatches indicated for valves vaults (showing an associated ladder – per the Drawings) shall include a ladder-up device.

PART 3 EXECUTION

3.1 INSPECTION

- A. Installer must examine areas and conditions under which each structure is to be installed and notify Contractor in writing of those conditions detrimental to proper completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Contractor.

3.2 INSTALLATION OF FACTORY-FABRICATED UNITS

- A. General - Install structure as indicated, in accordance with manufacturer's written instructions, and in accordance with recognized industry practices to ensure compliance with requirements and intended purposes.
- B. Precast Concrete Units - Place precast concrete sections as indicated.
 1. Install rubber joint gasket at joints between sections.
 2. Apply bituminous mastic coating at joints between sections.
 3. Apply butyl rubber sheet patch at exterior of all joints.
 4. Apply bonding agent to enhance the adhesion of the grout to the concrete floor.

3.3 MANHOLE RUNG INSTALLATION

- A. Aluminum manhole rungs shall be cast into precast sections, on 12 inch centers, by the manufacturer that casts the precast sections. Those parts of the rung which are embedded shall receive a heavy coating of zinc chromate or other approved paint.
- B. Steel reinforced copolymer polypropylene plastic steps shall be press fitted by hand driven hammer into preformed holes in cured precast sections on 12 inch centers, by the manufacturer that casts the precast sections.

3.4 DAMPPROOFING

- A. Below-grade outer surfaces of precast units shall be given two coats of bituminous dampproofing at the rate of 30-60 sq. ft. per gallon in accordance with manufacturer's instructions.

3.5 BACKFILLING

- A. General - Delay backfilling of excavation until after Owner's Project Representative's inspection has been completed. Backfilling shall be in accordance with Section 02315.

3.6 LEAKAGE TEST

- A. Watertightness test: The structures shall be tested for watertightness. Completely fill tanks and allow them to stand for 24 hours. Top up tanks as necessary. Measure the drop in liquid level over the second 24-hour period. Watertightness shall be defined as loss of liquid level less than 0.5% in 24 hours.
- B. Watertightness Test Failure - In case leakage exceeds the above specified amount, locate the leaks and repair them at no additional cost to the Owner.

END OF SECTION

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SECTION 06100

ROUGH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

A. SECTION INCLUDES

1. Wood nailers and blocking

1.2 REFERENCES

- A. The New York State Building Code, latest edition
- B. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- C. ASTM A446 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality
- D. ASTM D1761 - Testing Mechanical Fasteners in Wood
- E. ASTM E489 - Tensile Strength Properties of Steel Truss Plates
- F. ASTM E767 - Shear Resistance of Steel Truss Plates
- G. AWPA Analytical Standards: A2-98, A3-00, A9-00, A16-93, A17-97, A18-99
- H. AWPA C1 - All Timber Products
- I. AWPA C2 - Lumber, Timber, Bridge Ties and Mine Ties
- J. AWPA C9 - Plywood
- K. AWPA C15 - Wood for Commercial-Residential Construction
- L. AWPA P5 - Waterborne Preservatives
- M. AWPA M4 - Standard for the Care of Preservative Treated Wood Products
- N. ICBO ES ER-4981
- O. National Evaluation Report (NER): Report No. NER-628
- P. National Evaluation Report (NER): Report No. NER-643
- Q. Inspection Agencies - Inspection agencies and the abbreviations used to reference with lumber grades and species include the following:
 - ALSA - American Lumber Standards Committee: Softwood Lumber Standards
 - APA - American Plywood Association
 - NFPA - National Forest Products Association
 - RIS - Redwood Inspection Service
 - NELMA - Northeastern Lumber Manufacturers Association

NLGA - National Lumber Grades Authority (Canadian)

SPIB - Southern Pine Inspection Bureau

WCLIB - West Coast Lumber Inspection Bureau

WWPA - Western Wood Products Association

R. Truss Plate Institute (TPI)

1. Recommended Code of Standard Practice for the Metal Plate Connected Wood Truss Industry
2. Quality Control Manual
3. Bracing Wood Trusses: Commentary and Recommendation
4. Design Specification for Metal Plate Connected Wood Trusses

1.3 DEFINITIONS

- A. Rough carpentry includes carpentry work not specified as part of other sections and which is generally not exposed, except as otherwise indicated.

1.4 SUBMITTALS

- A. Submit chemical treatment manufacturer's instructions for handling, storing, installation and finishing of treated material.
1. For each type of pressure treatment specified, include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained and conformance with applicable standards.
 2. For water-borne treatment, include statement that moisture content of treated materials was reduced to levels indicated prior to shipment to project site.
 3. Evaluation Report:
 - a. NER-628
 - b. NER-643
 - c. ICBO ES ER-4981
 4. Warranty documents
- B. Submit shop drawings of wood blocking installation and other rough carpentry work. Describe proposed methods of installation and anchorage to structure showing sizes, types, thicknesses, connections of wood blocking and related items, including adjoining work by other trades.
- C. Take all necessary field measurements before preparation of shop drawings and fabrication. Do not delay progress of the job. If field measurements are not possible prior to fabrication, allow for field cutting and fitting.
- D. Manufacturer's literature for all metal connectors and framing anchors

- E. Wood-preservative-treatment data from chemical treatment manufacturer. Include certification of chemical solution and affirm that it complies with indicated treatment standard.

1.5 QUALITY ASSURANCE

- A. Design standards shall conform to applicable provisions of NFPA and TPI Specification.
- B. Source: For each material type required for the work of this section, provide primary materials that are the product of one manufacturer. Provide secondary or accessory materials that are acceptable to the manufacturers of the primary materials.
 - 1. Alkaline copper quaternary (ACQ) preservative-treated wood products from a single approved source.
 - 2. Wood Treatment Plant Qualifications: Wood treatment plant experienced in performing work of this section which has specialized in the treatment of wood similar to that required for this project, licensed by the manufacturer.
- C. Installer: A firm with a minimum of three years experience in type of work required by this section and which is acceptable to the truss manufacturers.
- D. Regulatory Requirements: Provide preservative treatment that complies with the following regulatory requirements:
 - 1. NES Report No. NER-643
 - 2. ICBO ES ER-4981
- E. Quality Mark: All ACQ preservative-treated wood members shall bear an end tag or permanent ink stamp indicating the following:
 - 1. Name of wood treating company
 - 2. Treatment plant city and state
 - 3. Symbol for alkaline copper quaternary (ACQ)
 - 4. Preservative retention level
 - 5. Approved use
 - 6. Code report number

1.6 TESTING AND INSPECTION

- A. Materials and workmanship under this Section may be subject to inspection in the mill, shop, or field by the Engineer or by qualified inspectors selected by the Engineer and paid directly by the Owner.
- B. However, such inspection, wherever conducted, shall not diminish truss fabricator's responsibility to provide his own inspection, testing, and quality control, and to furnish materials and workmanship in accordance with Contract requirements, nor shall inspector's acceptance of materials or workmanship prevent later rejection of same by Owner or Engineer if defects are discovered.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber; provide for air circulation within and

around stacks and under temporary coverings including polyethylene and similar materials.

1. For lumber treated with waterborne chemicals, sticker between each course to provide air circulation.

1.8 PROJECT CONDITIONS

- A. Coordination - Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of nailers, blocking, grounds and similar supports to allow attachment of other work.

PART 2 PRODUCTS

2.1 GENERAL

- A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.
 1. Grade Stamps - Factory-mark each piece of lumber with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing and mill.
 - a. Apply grade stamps to ends or back of each piece, or omit grade stamps entirely and issue certificate of grade compliance from inspection agency in lieu of grade stamp.
 2. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.
 - a. Provide dressed lumber, S4S, unless otherwise indicated.
 - b. Provide lumber with 19% maximum moisture content at time of dressing and shipment for sizes 2" or less in nominal thickness, unless otherwise indicated.
 3. Wood nailers for roof shall conform to Factory Mutual's Loss Prevention Data Sheet 1-49.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPAC2 (lumber) and AWPAC9 (plywood), except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPAC31 with inorganic boron (SBX).
 1. Preservative Chemicals:
 - a. Alkaline copper quaternary (ACQ)
 - b. Chromated copper arsenate (CCA)
- B. End Cut Preservative: Treat cut ends in accordance with manufacturer's recommendations.
- C. Adhesive: Use adhesives in accordance with manufacturer's recommendations.

- D. Kiln-dry preservative treated lumber and plywood panel material after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood. Do not use material that is warped or does not comply with requirements for untreated material.
- E. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.
- F. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
 - 3. Southern Yellow Pine No. 2 or better per SPIB rules

2.3 DIMENSION LUMBER

- A. General: Provide dimension lumber of grades indicated according to the American Lumber Standards Committee National Grading Rule provisions of the grading agency indicated. No. 2 grade and any of the following species:
 - 1. Hem-fir or Hem-fir (north); NLGA, WCLIB, or WWP
 - 2. Spruce-pine-fir (south) or Spruce-pine-fir; NELMA, NLGA, WCLIB, or WWP
 - 3. Western woods; WCLIB or WWP

2.4 MISCELLANEOUS LUMBER

- A. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:
 - 1. Hem-fir or Hem-fir (north), No. 2 Common grade; NLGA, WCLIB, or WWP
 - 2. Spruce-pine-fir (south) or Spruce-pine-fir, No. 2 Common grade; NELMA, NLGA, WCLIB, or WWP
 - 3. Eastern softwoods, No. 2 Common grade; NELMA
 - 4. Northern species, No. 2 Common grade; NLGA
 - 5. Western woods, Construction or No. 2 Common grade; WCLIB or WWP

2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture and compatible with the pressure treatment chemicals.
 - 1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or Type 304 stainless steel.

- B. Nails, Brads, and Staples: ASTM F 1667
- C. Power-Driven Fasteners: CABO NER-272
- D. Wood Screws: ASME B18.6.1
- E. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
- F. Lag Bolts: ASME B18.2.1. (ASME B18.2.3.8M).
- G. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.
- H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
 - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
- I. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Grade A1 or A4).

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- B. Do not use materials with defects that impair quality of rough carpentry or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- C. Cutting, framing and fitting shall be done as necessary for the accommodation of other work. The use of wood chips, shims, or other shrinkable material for leveling will not be permitted. Holes shall be bored accurately for bolts and as required to prevent splitting wood. Bolts shall be drawn up tight.
- D. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- E. Apply field treatment complying with AWWPA M4 to cut surfaces of preservative-treated lumber and plywood.
- F. Select pressure treated members in accordance with appropriate untreated lumber and plywood span tables. Provide ventilation of building cavities as required by code.

- G. Install pressure treated wood in accordance with requirements of applicable codes. Avoid milling operations that could adversely affect preservative characteristics of ACQ treated wood.
- H. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. New York State Building Code, most recent edition
- I. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.

3.2 WOOD FURRING, GROUNDS, NAILERS, AND BLOCKING

- A. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate location with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.
- C. Provide wherever shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.
- D. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.
- E. Install treated wood nailers, blocking and plywood at locations indicated on Drawings.
- F. Install continuous wood nailers at the perimeter of the entire roof and around roof projections and penetrations as shown on the Drawings.
- G. Contractor shall conduct pullout tests prior to start of nailer, blocking and plywood installation.
- H. Nailers shall be anchored to resist a minimum force of 300 pounds per lineal foot in any direction. A 1/2 inch space shall be provided between nailer lengths. Individual nailer lengths shall not be less than 3 feet long. Nailer fastener spacing shall not exceed 12 inches on center. Fasteners shall be staggered 1/3 the nailer width and installed within 6 inches of each end. Nailer attachment shall meet this requirement and that of the current Factory Mutual Loss Prevention Data Sheet 1-49.
- I. Thickness of nailers and woodwork shall be as indicated on Drawings to match substrate or insulation height to allow smooth transition.
- J. Wood nailers and woodwork are generally indicated in nominal lumber sizes, where required, whether indicated or not, the roofing contractor shall furnish, ripped, continuous, plywood shims to create nailer heights to match conditions.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective woodwork where possible to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

END OF SECTION

SECTION 07130

SHEET MEMBRANE WATERPROOFING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Sheet Membrane Waterproofing
 - 2. Protection Course

1.2 REFERENCES

- A. ASTM D 412 – Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers -Tension
- B. ASTM D 570 – Standard Test Method for Water Absorption of Plastics
- C. ASTM D 751 – Standard Test Methods for Coated Fabrics
- D. ASTM D 882 – Standard Test Method for Tensile Properties of Thin Plastic Sheeting
- E. ASTM D 1970 – Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
- F. ASTM D 3767 – Standard Practice for Rubber – Measurement of Dimensions
- G. ASTM E 96 (B) – Standard Test Method for Water Vapor Transmission of Materials
- H. ASTM E 154 – Standard Test Method for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover

1.3 SYSTEM DESCRIPTION

- A. Product is a self-adhesive membrane of not less than 60 mils thickness, consisting of a rubberized asphalt membrane laminated to a 4 mil cross-laminated polyethylene film.

1.4 SUBMITTALS

- A. Manufacturer's product literature and installation instructions
- B. Documentation stating manufacturer's acceptance of subcontractor as an approved applicator for the specified materials
- C. Sample warranty identifying the terms and conditions stated in Section 1.8

1.5 QUALITY ASSURANCE

- A. Comply with applicable codes, regulations, ordinances, and laws regarding use and application of products that contain volatile organic compounds (VOC).
- B. Prior to beginning work, convene a conference to review conditions, installation procedures, schedules and coordination with other work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to project site in original, factory-sealed, unopened containers bearing manufacturer's name and label intact and legible with following information.
 - 1. Name of material
 - 2. Manufacturer's stock number and date of manufacture
 - 3. Material safety data sheet
- B. Store materials in protected and well ventilated area.

1.7 PROJECT CONDITIONS

- A. Do not apply membrane when surface temperature is below or inclement weather conditions conflict with manufacturer's published requirements.
- B. Coordinate waterproofing work with other trades. The approved applicator shall have sole right of access to the specified areas for the time needed to complete the installation.
- C. Warn personnel against breathing of vapors and contact of material with skin or eyes. Wear applicable protective clothing and respiratory protection gear.
- D. Keep flammable products away from spark or flame. Do not allow the use of spark producing equipment during application and until all vapors have dissipated. Post "NO SMOKING" signs.
- E. Maintain work area in a neat and orderly condition, removing empty containers, rags, and rubbish daily from the site.

1.8 WARRANTY

- A. Upon completion and acceptance of the work required by this section, the manufacturer shall issue a warranty agreeing to promptly replace defective materials for a period of 5 years at no cost to the Owner.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- 1. Carlisle Coatings and Waterproofing Incorporated.
- 2. GCP Applied Technologies (Formerly Grace Construction Products).
- 3. Or equal.

2.2 PRODUCTS

- A. Self-Adhesive Sheet Membrane Waterproofing shall consist of a 56 mil rubberized asphalt membrane laminated to 4 mil cross-laminated polyethylene film, and shall meet or exceed the following requirements:
 - 1. Tensile Strength: 325 psi minimum, ASTM D 412
 - 2. Ultimate Elongation: 300% minimum, ASTM D 412
 - 3. Puncture Resistance: 50 lbs. minimum, ASTM E 154

4. Permeance: 0.05 Perm maximum, ASTM E 96 (B)
5. Low Temperature Flexibility: Unaffected at -45°F, ASTM D 1970, 1" mandrel
6. Tensile to Film: 5000 psi, ASTM D 882
7. Thickness: 60 mils, ASTM D 3767
8. Hydrostatic Head: 230 ft., ASTM D 751
9. Water Absorption: 0.1% by wt., ASTM D 570

2.3 ACCESSORY PRODUCTS

- A. Surface Primer: Water-based primer.
- B. Mastic: Mastic recommended by manufacturer for each condition.
- C. Sealants: Two-component polyurethane sealant by membrane manufacturer.
- D. Backing Rod: Closed-cell polyethylene foam rod.
- E. Protection Course: Recommended product by manufacturer for horizontal or vertical surfaces.

PART 3 EXECUTION

3.1 INSPECTION

- A. Before any waterproofing work is started the approved applicator shall examine all surfaces for any deficiencies. Should any deficiencies exist, the Owner, Engineer, and Contractor shall be notified in writing and corrections made.
- B. Condition of Concrete Surfaces:
 1. The concrete surfaces shall be of sound structural grade and shall have a smooth finish, free of fins, ridges, protrusions, rough spalled areas, loose aggregate, exposed coarse aggregate, voids or entrained air holes. Rough surfaces shall receive a well-adhered parged coat.
 2. Concrete shall be cured by water curing method. Any curing compounds must be of the pure sodium silicate type and be approved by the manufacturer's representative.
 3. Concrete shall be cured at least 7 days and shall be sloped for proper drainage.
 4. Voids, rock pockets and excessively rough surfaces shall be repaired with approved non-shrink grout or ground to match the unrepaired areas.
 5. Surfaces at cold joints shall be on the same plane.

3.2 SURFACE PREPARATION

- A. The concrete surface shall be clean, dry and free from any surface contaminants or cleaning residue that may harmfully affect the adhesion of the membrane.
- B. Install a 3/4 inch face, 45 degree cant of polyurethane sealant at all angle changes and inside corners including penetrations through the deck, walls, curbs, etc.

- C. Cracks greater than 1/16 inch in width and all moving cracks less than 1/16 inch in width shall be routed out to 1/4 inch minimum in width and depth and filled flush with polyurethane sealant.
- D. Expansion joints less than 1 inch wide shall be cleaned, primed, fitted with a backing rod and caulked with polyurethane sealant. For larger joints, use standard detail recommended by membrane manufacturer.
- E. Allow sealant to cure overnight.
- F. Stir primer. Apply a thin film of primer 10 inches wide, centered over sealed cracks and joints, hairline cracks, and cold joints. Apply primer 8 inches on each side of all corners. Prime concrete around drain flanges. Allow primer to dry per manufacturer's recommendations.
- G. Install an 8 inch wide strip of sheet membrane centered over joints and cracks. Install a 12 inch wide strip of sheet membrane centered over the axis of all corners.

3.3 APPLICATION

- A. Priming: Clean surfaces to remove residual dust before priming. Stir primer. Apply by spray or roller at a rate recommended by manufacturer. Allow to dry per manufacturer's recommendation.
- B. Horizontal surfaces: Install sheet membrane from low to high point, so that laps will shed water. Overlap edge seams 2½ inches, end laps 5 inches. Stagger end seams. Roll in place with an 18 to 24 inch wide, 100 lb. (min.) resilient roller. Ensure that laps are firmly adhered and that there are no gaps or fish-mouths.
- C. Vertical Surfaces: Apply in lengths of 8 feet or less. Overlap edge seams 2½ inches. On walls over 8 feet high, apply in 8 foot sections, starting at the lowest point with the higher section overlapping the lower section 5 inches. Roll in place using firm pressure with a hand roller.
- D. Terminations: Consult manufacturer's standard details for proper terminations. Roll terminating edges firmly. Apply mastic to terminations and "T" joints. Apply mastic to laps at angle changes, extending 9 inches in each direction.

3.4 PROTECTION COURSE

A. VERTICAL APPLICATION:

- 1. Install protection board on all vertical surfaces.

B. HORIZONTAL APPLICATION:

- 1. Install protection board on all horizontal surfaces. If flood testing is delayed, install a temporary covering to protect membrane from damage by other trades.

END OF SECTION

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SECTION 07210

BUILDING INSULATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Board-type building insulation
 - 2. Board-type insulation at perimeter foundation walls and underside of floor slabs

1.2 REFERENCES

- A. ASTM C578
- B. ASTM C665
- C. ASTM C764
- D. ASTM E96

1.3 SUBMITTALS

- A. Product Data - Submit manufacturer's product literature and installation instructions for each type of insulation and vapor retarder material required.

1.4 QUALITY ASSURANCE

- A. Thermal Resistivity - Where thermal resistivity properties of insulation materials are designated by R-values they represent the rate of heat flow through a homogenous material exactly 1 inch thick, measured by test method included in referenced material standard or otherwise indicated. They are expressed by the temperature difference in degrees F between the two exposed faces required to cause one BTU to flow through one square foot per hour at mean temperature indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. General Protection - Protect insulations from physical damage from handling, weather, and construction operations before, during, and after installation. Protect insulations from becoming wet, soiled, or covered with ice or snow.
 - 1. Comply with manufacturer's recommendations for handling, storage and protection during installation.
 - 2. Protect against ignition at all times. Do not deliver insulating materials to project site ahead of installation time.
- B. Protection for Plastic Insulation
 - 1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
 - 2. Complete installation and concealment of plastic materials as rapidly as possible in each area of work.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products of one of the following:

1. Extruded Polystyrene Board Insulation for Foundations and Slabs
 - a. Amoco Foam Products Co.
 - b. Dow Chemical U.S.A.
 - c. Owens-Corning
 - d. Or equal
2. Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
 - a. Dow Chemical U.S.A.
 - b. CELOTEX
 - c. Or equal

2.2 INSULATING MATERIALS

A. General - Provide insulating materials which comply with requirements indicated for materials, compliance with referenced standards, and other characteristics.

1. Preformed Units - Sizes to fit applications indicated, selected from manufacturer's standard thickness, widths and lengths.
2. Where thermal resistance ("R" value) is specified or shown for insulation, the thickness shown on the drawings is nominal. Use only insulation with actual thickness that is not less than that required to provide the thermal resistance specified.

B. Extruded Polystyrene Board Insulation - Rigid, cellular thermal insulation with closed-cells and integral high density skin, formed by the expansion of polystyrene base resin in an extrusion process to comply with ASTM C578 Type IV. Aged 5-year R-values of 5.4 and 5 at 40°F and 75°F (4.4 and 23.9°C) per inch, respectively; and as follows:

1. Density: 1.6 lbs per cu. ft. minimum.
2. Compressive Strength: 25 psi minimum.

C. Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board

1. Insulation board shall be rigid glass fiber-reinforced polyisocyanurate foam board covered with embossed aluminum facing on both sides.
2. Insulation board facing shall have a water permeance (perm) rating of 0.03 when tested in accordance with ASTM E96.
3. Insulation board shall have a flame spread rating of 25 or less and smoke development rating of less than 90 per ¾-inch thickness of insulation.
4. Thermal resistance of insulation shall not have an R-value less than 15.

2.3 AUXILIARY INSULATING MATERIALS

- A. Provide insulation fasteners, anchors, plates, washers, standoffs, hangers and like accessories recommended by the insulation manufacturer for the secure installation of insulating materials.
- B. Adhesive for Bonding Insulation - Type recommended by insulation manufacturer, and complying with requirements for fire performance characteristics.
- C. Crack Sealer for Board Insulation - Provide polymeric insulating foam in aerosol dispenser designed for filling voids in board insulation.

PART 3 EXECUTION

3.1 INSPECTION AND PREPARATION

- A. Require Installer to examine substrates and conditions under which insulation work is to be performed. A satisfactory substrate is one that complies with requirements of the section in which substrate and related work is specified. Contractor shall obtain Installer's written report listing conditions detrimental to performance of work in this section. Do not proceed with installation of insulation until unsatisfactory conditions have been corrected.
- B. Clean substrates of substances harmful to insulations or vapor retarders, including removal of projections which might puncture vapor retarders.

3.2 INSTALLATION, GENERAL

- A. Comply with manufacturer's instructions for particular conditions of installation in each case. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.
- B. Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projects, which interfere with placement.

3.3 INSTALLATION OF PERIMETER AND UNDER-SLAB INSULATION

- A. On vertical surfaces, set units in adhesive applied in accordance with manufacturer's instructions. Use type of adhesive recommended by manufacturer of insulation.
- B. Install insulation 4 feet min. below the first floor slab against the perimeter foundation wall or as shown on the Drawings and 2 feet from the perimeter wall against the first floor slab, unless otherwise shown on the Drawings.

3.4 PROTECTION

- A. General - Protect installed insulation from harmful weather exposures and from possible physical abuses, where possible by non-delayed installation of concealing work or, where that is not possible, by temporary covering or enclosure.

END OF SECTION

SECTION 07530**EPDM SHEET ROOFING****PART 1 GENERAL****1.1 SUMMARY****A. Work Includes**

1. Containment and cleanup of debris generated by any work of this project, sufficient to prevent debris from entering the interior of the building, any treatment tank, any roof drains, or the nearby reservoir.
2. All demolition required to facilitate the installation of the new roofing system.
3. Installation of a fully adhered roofing membrane with flashings, and other items required by the roofing manufacturer to comprise a total roofing system, backed by a 30-year system warranty.
4. The Work includes but is not necessarily limited to the installation of:
 - a. Vapor barrier
 - b. Insulation
 - c. Fasteners
 - d. Roof membrane
 - e. Roof membrane flashings
 - f. Metal flashings
 - g. Sealants and adhesives
 - h. Wood blocking
 - i. Roof fire barrier/recovery board

B. RELATED SECTIONS

1. Section 07620 - Sheet Metal Flashing and Trim

1.2 REFERENCES

- A. The New York State Building Code, Latest Edition.
- B. American Society for Testing and Materials (ASTM):

A167	Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip
B209	Aluminum and Aluminum-Alloy Sheet and Plate
D751	Testing Coated Fabrics
D2103	Polyethylene Film and Sheeting

- D2240 Rubber Property - Durometer Hardness
- D3884 Abrasive Resistance of Textile Fabrics (Rotary Platform, Double-Head Method)
- D4637 Vulcanized Rubber Sheet Used in Single-Ply Roof Membrane
- D4586 Asphalt Roof Cement, Asbestos Free
- E96 Water Vapor Transmission of Materials
- E108 Fire Tests of Roof Coverings

C. American National Standards Institute (ANSI)

- 1. ANSI/FM 4474-2004 (R2010) - American National Standard for Evaluating the Simulated Wind Uplift Resistance of Roof Assemblies Using Static Positive and/or Negative Differential Pressures

D. Underwriter Laboratories (UL)

- 1. UL 790 - Standard Test Methods for Fire Tests of Roof Coverings.

E. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - (latest issue)

F. Factory Mutual Loss Prevention Data Sheet 1-49 (latest issue)

G. National Roofing Contractors Association (NRCA)

- 1. Roofing and Waterproofing Manual

1.3 SUBMITTALS

- A. The insulation manufacturer shall send, in writing to the Engineer and single-ply manufacturer, a copy of their recommendations for use of his product, including:
 - a. Name of specific project
 - b. Recommended procedures for attachment of insulation to deck, including quantity, density, and/or spacing.
 - c. Recommended procedures for adhering single ply roofing to insulation.
 - d. Statements which express warranty conditions for the successful performance of their insulation for the duration of the single ply manufacturer's warranty.
- B. Applicators approval certification by manufacturer.
- C. Proposed single ply manufacturer's specifications.
- D. Sample copy of membrane manufacturer's 30 year system warranty.
- E. Written documentation from the roofing system manufacturer indicating that they have been advised of all materials proposed for use, including the insulation substrate, fastenings and methods of installation, and that they are satisfied that all the materials and methods are compatible with their system, presenting no exception affecting the issuance of the specified warranty.

F. Shop Drawings:

1. Sheet membrane layout.
2. Fastener pattern, layout, and spacing requirements for mechanically fastening insulation to metal roof deck.
3. Termination details, Base flashings, cants.
4. Board by board layout of any tapered system, complying with the drainage pattern required.
5. Complete board layout of all insulation component, thicknesses, and the average "R" value of the completed insulation system.
6. Verification of all roof conditions, including but not limited to: dimensions, elevations, and equipment, and conformance of same with the insulation manufacturer prior to shipment.
7. Walkway pad route drawing.

G. ANSI/FM 4474-2004 (R2010) test data demonstrating that the proposed roof assembly exhibits a tested uplift load capacity (L) equal to the design pressures of Part 1.5 B 4 multiplied by a minimum safety factor of 1.7.**H. Manufacturers installation instructions revised for project.****I. Samples:**

1. Sheet membrane: One 6 inch square piece.
2. Sheet flashing: One 6 inch square piece.
3. Fasteners: Two, each type.
4. Seam: Two 12 inch square samples of joined seams to represent quality of field joined seams.

1.4 QUALITY ASSURANCE

- A. The roofing system shall be applied only by an approved contractor authorized prior to Bid by roof membrane manufacturer.
- B. The roofing & flashing methods to be employed shall be a complete system, with all insulation, membrane and flashing components and details of installation as recommended by the roofing system manufacturer, which are recognized in the roofing industry for having manufactured and warranted the type of installation proposed, for at least ten (10) years.
- C. Roofing installer shall be experienced in the installation of the specified system(s) and shall be able to demonstrate: not less than eight (8) years of continuous business operation in the roof contracting trade, not less than five (5) years as an approved contractor for the roof membrane manufacturer, and a minimum of five (5) warranted installations of the specified system of comparable scope and size to this project. Roofing installer shall be currently licensed by the approved roofing system manufacturer complying with the requirements of the Contract Documents.

1. Work associated with elastomeric membrane roofing, including (but not limited to) vapor retarders, insulation, flashing and counter flashing, and expansion joints is to be performed by Installer of elastomeric membrane roofing.

D. Before the Contract is awarded, provide proof of the following:

1. The system manufacturer is familiar with all substrate materials proposed for use, and that the manufacturer agrees to provide all necessary on-site technical assistance to achieve a satisfactory installation.
2. All materials and workmanship will be in strict accordance with the manufacturer's recommendations.
3. The installation will be under the constant supervision of an experienced factory trained, licensed contractor. All work pertaining to the installation of the system shall only be completed by contractor personnel trained and authorized by the approved manufacturer in those procedures.
4. A technical representative directly employed by the manufacturer shall visit the Site to inspect the installation of the membrane at least three (3) times each week, and will conduct a final inspection to observe the installed roof system and ascertain that the roofing system has been installed according to applicable manufacturer's specifications & details.
 - a. The manufacturer representative shall also provide a written report certifying that the roof membrane has been installed according to manufacturer recommendations and standards.

E. There shall be no deviation made from the Specification or the approved Shop Drawings without prior written approval by the system manufacturer, the Engineer and the Owner.

F. Roofing installer/contractor shall provide a constant full-time superintendent that shall be on site at all times while any work is in progress.

1.5 PERFORMANCE REQUIREMENTS

A. Submit evidence that the proposed roofing system will meet the identified requirement of the following recognized code approval or testing agencies. These requirements are minimum standards and no roofing work shall commence without written documentation of the system's compliance, as required in the "Submittals" section of this Specification.

1. Underwriters Laboratories
 - a. UL 790 - Class B Roof Assembly
2. American Society of Testing and Materials
 - a. ASTM D4637 - Type I Membrane

B. The materials system and installation shall be resistant to wind uplift to meet Connecticut State Building Code, latest edition, requirements with the following:

1. Basic Wind Speed (3 Second Gust): 144 mph (ULT)
2. Exposure: C
3. Bldg. Risk Category: III
4. According to ASCE 7-10, these parameters will result in the following ultimate uplift pressures for roof fasteners or adhesives:

- a. Within 12 feet of a corner: 130 psf
- b. Within 12 feet of an edge: 90 psf
- c. At other areas: 60 psf

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, and handle materials as specified by manufacturer.
- B. Store volatile materials separate from other materials with separation to prevent fire from damaging the work, or other materials.
- C. Protect foam insulation from direct exposure to sunlight.

1.7 WARRANTY

- A. 30-Year Total Systems Warranty: Upon successful completion of the Work and prior to receipt of final payment, provide 30-year Total Systems Warranty including materials and labor with no dollar limit from the approved membrane manufacturer.
- B. Manufacturer's Warranty: Shall provide wind speed coverage of 100 miles per hour.

PART 2 PRODUCTS

2.1 GENERAL

- A. Materials, products & installation procedures listed herein establish a minimum standard of quality by which the Engineer will evaluate all other materials proposed to accomplish the specified scope of work.
- B. Components to be used that are other than those supplied or manufactured by the approved manufacturer may be submitted for review and acceptance by the manufacturer providing the system warranty. Manufacturer's acceptance of any other product is only for a determination of compatibility with their products. The specifications, installation instructions, limitations, and/or restrictions of the respective manufacturers must be reviewed by the Engineer for acceptability for use with the approved system/membrane manufacturer's products.

2.2 EPDM SHEET ROOFING

- A. Conform to ASTM D4637, Type I, Grade 1, color tan.
- B. Ethylene, propylene, diene, terpolymer (EPDM) formed into uniform, flexible sheets, 90 mil thick supplied in largest approved sheets possible for the Project, complying with ANSI/RMA IPR-1 and the following physical properties:
 - 1. Tensile Strength – 1305 psi min. (ASTM D412)
 - 2. Elongation – 300% min. (ASTM D412)
 - 3. Tear Resistance, Die C – 150 lbf/in min. (ASTM D624)
 - 4. Ozone Resistance – 7 days, 100 pphm, 104 degrees F, 50% extension, no cracks (ASTM D1149)
 - 5. Heat Aging, Accelerated, 4 Weeks/240 degrees F (ASTM D573)

- a. Tensile strength – 1205 psi min.
- b. Elongation – 200% min.
- 6. Brittleness Temperature – minus 49 degrees F (ASTM D746)
- 7. Permeability, Water Vapor, Proc. BW – 0.10 perms max. (ASTM E96)
- 8. Factory Seam Strength – membrane ruptured (ASTM D816, modified)

PROPERTY	TEST METHOD	REQUIREMENT
Shore A Hardness	ASTM D2240	55 to 75 Durometer
Water Vapor Permeance	ASTM E96	Minimum 0.14 perms Water Method
Fungi Resistance	ASTM G21	After 21 days, no sustained growth or discoloration.
Fire Resistance	ASTM E108 Class A	No Combustion Beyond Flame/Heat Source

C. Thickness:

- 1. Use 0.090-inch thick sheet.

D. Pipe Boots:

- 1. Molded EDPM designed for flashing of round penetrations, 12 inch minimum height.
- 2. Color same as roof membrane.

2.3 EPDM FLASHING SHEET

- A. Conform to ASTM D4637, Type I, Grade 1, Class U, unreinforced, color same as roof membrane modified as specified for flashing.
- B. Self curing EPDM flashing, adaptable to irregular shapes and surfaces.
- C. Minimum thickness 0.090-inch.

2.4 MISCELLANEOUS ROOFING MEMBRANE MATERIALS

- A. Sheet roofing manufacturers specified products.
- B. Splice Adhesive: For roofing and flashing sheet.
- C. Lap Sealant: Liquid EPDM rubber for roofing sheet exposed lap edge.
- D. Bonding Adhesives: Neoprene, compatible with roofing membrane, flashing membrane, insulation, metals, concrete, and masonry for bonding roofing and flashing sheet to substrate.
- E. Fastener Sealer: One part elastomeric adhesive sealant.

F. Insulation: Rigid insulation shall be polyisocyanurate with integrated facing material both sides, approved for use under membrane. Insulation shall comply with FM 4450 or UL 1256 tests for use directly over concrete deck without thermal barrier. Provide tapered insulation as required to obtain counterslopes and provide tapered edge strip cut and installed as required at crickets and up-slope of roof accessories to insure approved drainage. Insulation shall have the following minimum properties:

1. R-value: 25 (minimum)
2. Density: 2.0 pcf (ASTM D1622)
3. Compressive Strength: 20 psi (ASTM C165)
4. Water Vapor Transmission Perm Rating: < 1.0 (ASTM E96)

G. Temporary Closure Sealers (Night Sealant): Polyurethane two part sealer.

H. Primers, Splice Tapes, Cleaners, and Butyl Rubber Seals: As specified by roof membrane manufacturer.

I. Asphalt Roof Cement: ASTM D4586.

2.5 MISCELLANEOUS LUMBER

A. Lumber for concealed boards or blocking shall be provided in accordance with Section 06100, Rough Carpentry.

2.6 METAL FLASHINGS AND TRIM

A. Metal flashings and trim shall be in accordance with specification 07620 – Sheet Metal Flashing and Trim.

2.7 FASTENERS

A. Fasteners and washers required for securing nailers to deck:

1. Steel stress plate washers as required by sheet roofing manufacturer:
 - a. Coated against corrosion.
 - b. Separate or attached to fastener.
 - c. Approximately 2-inch diameter or 1-1/2 by 2-1/2 inches rectangular plate with rounded corners, minimum thickness 0.023-inch.
2. Fastening strip or batten strip for securing roof membrane to deck:
 - a. Stainless steel strip: ASTM A167 type 302 or 304, minimum 0.018-inch thick.
 - b. Aluminum strip: ASTM B209, minimum 0.094-inch thick.
 - c. Rounded corners on strips.
 - d. Form strips 1-1/2 inches wide, 10 feet maximum length with 1/4 by 3/8 inch punched slotted holes at 4-inch centers; centered on width of strip. Punch holes 1/16 inch larger than fastener shank when shank is larger than 3/16 inch.
3. Wood:

- a. Screws; Fed. Spec. FF-S-111, Type I, Style 2.5, coated to resist corrosion, length to provide 3/4 inch minimum penetration.
- b. Nails: Barbed shank, galvanized.
- 4. Washers: Neoprene backed metal washer 1-1/8 inch minimum diameter.
- 5. To Sheet Metal: Self tapping screw; Fed. Spec. FF-S-107, No. 14. sheet metal screw, minimum thread penetration of 1/4 inch; stainless steel.
- B. Pipe Compression Clamp or Drawband:
 - 1. Stainless steel or cadmium plated steel drawband.
 - 2. Worm drive clamp device.

2.8 COVER BOARD

- A. Gypsum Board: ASTM C1278 non-faced, gypsum and cellulose fiber substrate, thickness to be minimum as required to achieve specified fire rating or 1/2", whichever is greater.

2.9 FLEXIBLE TUBING

- A. Closed cell neoprene, butyl polyethylene, vinyl, or polyethylene tube or rod.
- B. Diameter approximately 1-1/2 times joint width.

PART 3 EXECUTION

3.1 GENERAL

- A. Do not apply roof membrane if deck will be used for subsequent work platform, storage of materials, or staging or scaffolding will be erected thereon unless protection provided to distribute loads less than one-half compression resistance of roofing system materials.
 - 1. Curbs, blocking, edge strips, and other components to which roofing and base flashing is attached in place ready to receive insulation and, roofing.
 - 2. Coordinate roof operation with sheet metal work and roof insulation work so that insulation and flashing are installed concurrently to permit continuous roofing operations.
 - 3. Complete installation of flashing, insulation, and roofing in the same day except for the area where temporary protection is required when work is stopped.
- B. Phased construction is not permitted.
- C. Dry out surfaces that become wet from any cause during progress of the work before roofing work is resumed.
- D. Apply materials only to dry substrates.
- E. Except for temporary protection specified, do not apply materials during damp or rainy weather, during excessive wind conditions, nor while moisture (dew, snow, fog, ice, or frost) is present in any amount in or on the materials.

1. Do not apply materials to substrate having temperature of 40 degrees F or less, or when materials applied with the roof require higher application temperature.
2. Do not apply materials when the temperature is below 40 degrees F.

F. Temporary Protection:

1. Install temporary protection consisting of a temporary seal and water cut-offs at the end of each day's work and when work is halted for an indefinite period or work is stopped when precipitation is imminent.
2. Temporarily seal exposed surfaces of insulation within the roofing membrane.
3. Do not leave insulation surfaces or edges exposed.
4. Use polyethylene film or building paper to separate roof sheet from bituminous materials.
5. Apply the temporary seal and water cut off by extending the roof membrane beyond the insulation and securely embedding the edge of the roof membrane in 1/4-inch-thick by 2 inches wide strip of temporary closure sealant (night sealant) and weight edge with sandbags, to prevent displacement; space sandbags not over 8 foot centers. Check daily to ensure temporary seal remains watertight. Reseal open areas and weight down.
6. Before the work resumes, cut off and discard portions of the roof membrane in contact with roof cement or bituminous materials.
 - a. Cut not less than 6 inches back from bituminous coated edges or surfaces.
 - b. Remove temporary polyethylene film or building paper.
7. Remove and discard sandbags contaminated with bituminous products.
8. For roof areas that are to remain intact and that are subject to foot traffic and damage, provide temporary wood walkways with notches in sleepers to permit free drainage.
9. Provide 6 mil polyethylene sheeting or building paper cover over roofing membrane under temporary wood walkways and adjacent areas. Round all edges and corners of wood bearing on roof surface.

3.2 PREPARATION

- A. Test pull out resistance of fasteners in deck in the presence of the Engineer before starting roofing work. Tests are not required for wood. Tests will be required for any fasteners used to attach new nailers to concrete substrate where such fasteners are required by the roofing manufacturer.
1. Test applicable fastener type in applicable deck.
 2. Install fasteners through a sample of the insulation, if any is to be used, into the structural deck.
 3. Test the pull out resistance with a pull out tester.

4. Test one fastener in each deck level and one for every 2500 square feet of deck type and level.
 5. Test at locations designated by Engineer.
 6. Do not proceed with the roofing work if the pull out resistance of the fasteners is less than specified.
 7. Test results:
 - a. Repeat tests using other type fasteners or use additional fasteners to stay within the pullout load resistance criteria.
- B. The building and its contents shall be protected against all risks, and any damages shall be repaired or replaced. All exterior building and ground areas shall be protected from damage. Debris generated by any work of this project must be prevented from entering the interior of the building, any treatment tank, any roof drains, or the nearby reservoir.
1. This may include, but will not be limited to, cleaning by vacuum cleaner or other means daily, or more frequently, as needed to achieve the required result stated above.
 2. It may also be necessary to erect barriers to prevent the migration of sawdust or particles of insulation.
 3. The grounds surrounding the building will be monitored closely by the construction observer and Aquarion staff.
- C. Remove dirt, debris, and surface moisture. Cover or fill voids greater than 6 mm (1/4 inch) wide to provide solid support for roof membrane.
- D. Install separation sheet over bituminous material on deck surface lapping edges and ends 150 mm (6 inches) or as recommended by roof membrane manufacturer.
1. Do not install of separation sheet beyond what can be covered by roofing membrane each day.
 2. Use polyethylene, or building paper, that will be compatible with seaming method.
 3. Insure separation sheet completely isolates bituminous materials from EPDM roofing membrane.
 4. Turn up at penetrations, or other surfaces where bituminous materials occur, to cover bituminous product.
 5. Turn down over edges of blocking at perimeters to cover blocking.

3.3 INSULATION INSTALLATION

- A. Insulation shall be installed according to insulation manufacturer instructions using a low rise foam adhesive as specified in paragraph 3.3 F.
- B. Insulation shall be neatly cut to fit around penetrations and projections.
- C. Tapered insulation shall be installed in accordance with insulation manufacturer's approved shop drawings.

- D. Do not install more insulation board than can be covered with approved membrane by the end of the day or the onset of inclement weather.
- E. Use at least 2 layers of insulation when the total insulation thickness exceeds 2.5 inches. Stagger joints at least 12 inches between layers.
- F. Full spray or beads of urethane adhesive may be used. When applied in beads, bead spacing shall be as required by the roofing manufacturer's warranty requirements. Apply adhesive bead so that the distance from the edge of the board does not exceed half the required bead spacing.
- G. Walk the boards into the adhesive and roll using a 30" wide, 100-150 pound steel roller to ensure full embedment. Hold the insulation boards in place with weights until the adhesive has set.

3.4 INSTALLATION OF ROOFING AND FLASHING

- A. Install membrane by unrolling over prepared substrate, lapping adjoining sheets as recommended by the manufacturer, minimum of 3 inches. Cut sheets to maximum size possible to minimize seams.
- B. Do not allow the membrane to come in contact with surfaces contaminated with asphalt, coal tar, oil, grease, or other substances which are not compatible with EPDM roofing membrane.
- C. If possible, install the membrane so the sheets run perpendicular to the long dimension of the insulation boards.
- D. If possible, start at the low point of the roof and work towards the high point. Lap the sheets so the flow of water is not against the edges of the sheet. Coordinate with roof insulation installation.
- E. Position the membrane so it is free of buckles and wrinkles.
- F. Roll sheet out on deck; inspect for defects as sheet is being rolled out and remove defective areas.
 - 1. Allow 30 minutes for relaxing before proceeding.
 - 2. Lap edges and ends of sheets 3 inches or more as recommended by the manufacturer. Clean lap surfaces as specified by manufacturer.
 - 3. Adhesively splice laps. Apply pressure as required. Seam strength of laps as required by ASTM D4637.
 - 4. Check seams to ensure continuous adhesion and correct defects.
 - 5. Finish edges of laps with a continuous beveled bead of lap sealant to sheet edges to provide smooth transition as specified by manufacturer.
 - 6. Finish seams as the membrane is being installed (same day).
 - 7. Anchor perimeter to deck or wall as specified.
- G. Install flashings as the membrane is being installed (same day). If the flashing cannot be completely installed in one day, complete the installation until the flashing is in a watertight condition and provide temporary covers or seals.

H. Flashing Roof Drains:

1. Install roof drain flashing as recommended by the membrane manufacturer, generally as follows:
 - a. Coordinate to set the metal drain flashing in asphalt roof cement, holding cement back from the edge of the metal flange.
 - b. Do not allow the roof cement to come in contact with the EPDM roof membrane.
 - c. Adhere the EPDM roof membrane to the metal flashing with the membrane manufacturer's recommended bonding adhesive.
2. Turn down the metal drain flashing and EPDM roof membrane into the drain body and install clamping ring and stainer.

I. Installing EPDM Base Flashing and Pipe Flashing:

1. Install EPDM flashing membranes to pipes, walls or curbs to a height not less than 12 inches above roof surfaces and 4 inches on roof membranes.
 - a. Adhere flashing to pipe, wall or curb with bonding adhesive.
 - b. Form inside and outside corners of EPDM flashing membrane in accordance with NRCA EPDM Single-Ply Detail 1989-N. Form pipe flashing in accordance with NRCA Single-Ply Detail 1989-T-1, pipe boot, or 1987-T-2, flashing membrane.
 - c. Lap ends not less than 4 inches.
 - d. Adhesively splice flashing membranes together and flashing membranes to roof membranes. Finish exposed edges with sealant as specified.
 - e. Install flashing membranes in accordance with NRCA EPDM Single-Ply Details 1989 E, 1989-H, 1989-N and 1989-T-1 or 1989-T-2.
2. Anchor top of flashing to curbs with fasteners spaced not over 6 inches on center. Use surface mounted fastening strip with sealant on ducts. Use pipe clamps on pipes or other round penetrations.
3. Apply sealant to top edge of flashing.

J. Repairs to membrane and flashings:

1. Remove sections of EPDM sheet roofing or flashing that is creased wrinkled or fishmouthed.
2. Cover removed areas, cuts and damaged areas with a patch extending 4 inches beyond damaged, cut, or removed area. Adhesively splice to roof membrane or flashing. Finish edge of lap with sealant as specified.

3.5 FIELD QUALITY CONTROL

- A. Examine and probe seams in the membrane and flashing in the presence of the Engineer and Membrane Manufacturer's Inspector.

- B. Probe the edges of welded seams with a blunt tipped instrument. Use sufficient hand pressure to detect marginal bonds, voids, skips, and fishmouths.
- C. Cut 4 inch wide by 12 inch long samples through the seams where directed by the Resident Engineer.
 - 1. Cut one sample for every 1500 linear feet of seams.
 - 2. Cut the samples perpendicular to the longitudinal direction of the seams.
 - 3. Failure of the samples to maintain the standard of quality within a reasonable tolerance of the approved samples will be cause for rejection of the work.
- D. Repair areas of welded seams where samples have been taken or marginal bond voids or skips occur.
- E. Repair fishmouths and wrinkles by cutting to lay flat and installing patch over cut area extending 4 inches beyond cut.

3.6 COVER BOARD INSTALLATION

- A. Coordinate installing membrane roofing system components so cover board is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system manufacturer's written instructions for installing roof cover board.
- C. Install cover board with long joints of cover board in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with cover board.
 - 1. Cut and fit cover board within 1/4 inch of nailers, projections, and penetrations.
- D. Trim surface of cover board where necessary at roof drains so completed surface is flush and does not restrict flow of water.
 - 1. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.
- E. Preliminarily Fastened Insulation for Mechanically Fastened Systems: Install insulation with fasteners at rate required by roofing system manufacturer or applicable authority, whichever is more stringent.
- F. Adhered Cover Board: Adhere cover board to substrate as follows:
 - 1. Install in a two-part urethane adhesive according to roofing system manufacturer's instruction.
- G. Proceed with installation only after unsatisfactory conditions have been corrected

3.7 TEMPORARY ROOF

- A. Install temporary roof when sequences of work or weather does not permit installation of a completed permanent roof system or roof would be subject to phasing of roof work, construction traffic, scaffolds, and work over roof area. Temporary roofing shall be installed prior to leaving site each night that roofing/decking is not fully installed.

- B. Use 0.045-inch thick non-reinforced EPDM membrane or other temporary membrane as approved.
- C. Secure membrane to deck with mechanical fasteners or temporary ballast not exceeding deck dead load capacity.
- D. Temporary roofing/decking shall be securely fastened and tied down to withstand wind, snow, rain, and other environmental conditions.
- E. Repair cuts, tears, and punctures with patches to keep system watertight.
- F. Install permanent roof system within one year.

END OF SECTION

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SECTION 07620

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Exposed trim and fascia
 - 2. Metal flashing
 - 3. Copings
 - 4. Downspouts and gutters
- B. Related Sections
 - 1. Section 03485 – Precast Concrete Structures

1.2 REFERENCES

- A. The New York State Building Code, Latest Edition.
- B. ASTM B209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
- C. ASTM B32 – Standard Specification for Solder Metal
- D. ASTM D4397 – Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications
- E. ASTM E154 – Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover
- F. AAMA 605.2 – Specification for High Performance Organic Coatings on Architectural Extrusions and Panels
- G. SMACNA – Sheet Metal and Air Conditioning Contractors' National Association

1.3 PERFORMANCE REQUIREMENTS

- A. General: Install sheet metal flashing to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing.
- B. Fabricate and install flashings at roof edges to comply with requirements of Section 1504 of the New York State Building Code, latest Edition and for the following wind zones, whichever is more stringent:
 - 1. Wind Zone 1 (field): Wind pressures = 30 psf (suction)
 - 2. Wind Zone 2 (edge): Wind pressures = 35 psf (suction)
 - 3. Wind Zone 3 (corner): Wind pressure = 35 psf (suction)

1.4 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specifications.
- B. Shop Drawings of each item specified showing layout, profiles, methods of joining, and anchorage details.
- C. Samples of sheet metal flashing, trim, and accessory items, in the specified finish. Where finish involves normal color and texture variations, include sample sets composed of 2 or more units showing the full range of variations expected.
 - 1. 8-inch square samples of specified sheet materials to be exposed as finished surfaces.
 - 2. 12-inch long samples of factory-fabricated products exposed as finished Work. Provide complete with specified factory finish.
- D. Qualification data for firms and persons to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- E. As specified in Section 01330, submit certifications regarding all iron or steel products that all manufacturing processes occurred in the US.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an Installer with 10 years of experience and who has completed sheet metal flashing and trim work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

1.6 PROJECT CONDITIONS

- A. Coordinate Work of this Section with interfacing and adjoining Work for proper sequencing of each installation. Ensure best possible weather resistance, durability of Work, and protection of materials and finishes.

PART 2 PRODUCTS

2.1 METALS

- A. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated and with not less than the strength and durability of alloy and temper designated below:
 - 1. Aluminum Sheet: ASTM B209, 3003-H14, with a minimum thickness of 0.060 inch, unless otherwise indicated.
 - 2. Finish to match aluminum fascia on existing building.
 - 3. Provide factory painted finish for exposed aluminum flashing and trim consisting of 0.2 to 0.4 mil prime coat and minimum finish coat thickness of 1.0 mil baked at 450°F metal temperature. Coating system shall be Kynar 500 Fluoropolymer or equal.

2.2 MISCELLANEOUS MATERIALS AND ACCESSORIES

- A. Solder: ASTM B32, Grade Sn50, used with rosin flux.

- B. Fasteners: Same metal as sheet metal flashing or other non-corrosive metal as recommended by sheet metal manufacturer. Match finish of exposed heads with material being fastened.
- C. Asphalt Mastic: SSPC-Paint 12, solvent-type asphalt mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil dry film thickness per coat
- D. Mastic Sealant: Polyisobutylene; nonhardening, non-skinning, nondrying, nonmigrating sealant
- E. Elastomeric Sealant: Generic type recommended by sheet metal manufacturer and fabricator of components being sealed and complying with requirements for joint sealants as specified in Division 7 Section "Joint Sealants"
- F. Epoxy Seam Sealer: 2-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior and interior nonmoving joints, including riveted joints
- G. Adhesives: Type recommended by flashing sheet metal manufacturer for waterproof and weather-resistant seaming and adhesive application of flashing sheet metal
- H. Polyethylene Underlayment: ASTM D4397, minimum 6-mil thick black polyethylene film, resistant to decay when tested according to ASTM E154.
- I. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of Work, matching or compatible with material being installed; non-corrosive; size and thickness required for performance

2.3 FABRICATION, GENERAL

- A. Sheet Metal Fabrication Standard: Fabricate sheet metal flashing and trim to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.
- B. Comply with details shown to fabricate sheet metal flashing and trim that fit substrates and result in waterproof and weather-resistant performance once installed. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
- C. Form exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems.
- D. Expansion Provisions: Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- E. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
- F. Separate metal from non-compatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic or other permanent separation as recommended by manufacturer.

- G. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.
- H. Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, non-corrosive metal recommended by sheet metal manufacturer.
 - 1. Size: As recommended by SMACNA manual or sheet metal manufacturer for application but never less than thickness of metal being secured.

2.4 SHEET METAL FABRICATIONS

- A. General: Fabricate sheet metal items in thickness or weight needed to comply with performance requirements but not less than that listed below for each application and metal.
- B. Exposed Trim, Gravel Stops, and Fascia: Fabricate from the following material:
 - 1. Aluminum: 0.060 inch thick
- C. Base Flashing: Fabricate from the following material:
 - 1. Aluminum: 0.060 inch thick
- D. Leaders and Downspouts: Fabricate from the following material:
 - 1. Aluminum: 0.032 inch thick

2.5 ALUMINUM FINISHES

- A. General: Comply with Aluminum Association's (AA) "Designation System for Aluminum Finishes" for finish designations and application recommendations.
- B. High-Performance Organic Coating Finish: AA-C12C42R1x Organic Coating (as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's instructions.
 - 1. Fluoropolymer 2-Coat Coating System: Manufacturer's standard 2-coat, thermocured system composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 605.2.
 - a. Color and Gloss:
 - 1) Aluminum Fascia: Match existing fascia
 - 2) Gravel stop: As selected by the Owner.
 - 3) Edge Trim and Rake at Sloped Roofs: As selected by the Owner.
 - 4) Other materials and assemblies: As selected by Owner from manufacturer's full range of choices for color and gloss.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions under which sheet metal flashing and trim are to be installed and verify that Work may properly commence. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Unless otherwise indicated, install sheet metal flashing and trim to comply with performance requirements, manufacturer's installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Anchor units of Work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install Work with laps, joints, and seams that will be permanently watertight and weatherproof.
- B. Install exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
- C. Roof-Edge Flashings: Secure metal flashings at roof edges in accordance with performance requirements specified in Section 1.3.B.
- D. Expansion Provisions: Provide for thermal expansion of exposed sheet metal Work. Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- E. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pretin edges of sheets to be soldered to a width of 1-1/2 inches, except where pretinned surface would show in finished Work.
 - 1. Do not solder the following metals:
 - a. Aluminum.
 - 2. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
- F. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards. Fill joint with sealant and form metal to completely conceal sealant.
 - 1. Use joint adhesive for nonmoving joints specified not to be soldered.
- G. Seams:
 - 1. Fabricate nonmoving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 - 2. Fabricate nonmoving seams in aluminum with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

- H. Separations: Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces, at locations of contact, with asphalt mastic or other permanent separation as recommended by manufacturer.
1. Underlayment: Where installing stainless steel or aluminum directly on cementitious or wood substrates, install a slip sheet of red-rosin paper and a course of polyethylene underlayment.
 2. Bed flanges of Work in a thick coat of roofing cement where required for waterproof performance.

3.3 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.
- B. Provide final protection and maintain conditions that ensure sheet metal flashing and trim Work during construction is without damage or deterioration other than natural weathering at the time of Substantial Completion.

END OF SECTION

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SECTION 08110

STEEL DOORS AND FRAMES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Steel doors and frames.

B. Related Sections

1. Section 08710, Door Hardware – Templates for hardware, reinforcing and cut-outs in doors and frames and the furnishing of all hardware.
2. Section 09900, Painting – Finish painting of doors and frames.

1.2 REFERENCES

- A. ANSI A250.8 (Formerly SDI-100) – Recommended Specifications for Standard Steel Doors and Frames
- B. Steel Door Institute (SDI-105) – Recommended Erection Instruction for Steel Frames
- C. Door and Hardware Institute – Recommended Locations for Builder's Hardware
- D. ANSI A115 – Specification for Door and Frame Preparation for Hardware
- E. ASTM A90 – Standard Test Method for Weight (Mass) of Coating on Iron or Steel Articles with Zinc or Zinc-Alloy Coatings
- F. ASTM A153 – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- G. ASTM A568 – Standard Specification for Steel, Sheet, Carbon and High-Strength, Low Alloy, Hot-Rolled Sheet and Cold-Rolled Sheet
- H. ASTM A653 – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process
- I. ASTM A1008 – Standard Specification for Steel, Sheet, Cold-Rolled Carbon, Structural, High Strength Low-Alloy and High Strength Low Alloy with Improved Formability
- J. ASTM A1011 – Standard Specification for Steel, Sheet and Strip – Hot Rolled, Carbon Structural, High Strength Low-Alloy and High Strength Low Alloy with Improved Formability
- K. ASTM C1363 – Standard Test Method for the Thermal Performance of Building Assemblies by Means of a Guarded Hot Box
- L. ASTM E2074 – Standard Test Method for Fire Tests of Door Assemblies, Including Positive Pressure Testing of Side Hinged and Pivot Swinging Door Assemblies
- M. NFPA 80 – Standard for Fire Doors and Windows

1.3 SUBMITTALS

- A. Product Data – Submit manufacturer's technical product data substantiating that products comply with these requirements.
- B. Shop Drawings – Submit for fabrication and installation of steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.
 - 1. Provide schedule of doors and frames using same reference number for details and openings as those on Contract Drawings.
 - 2. Indicate coordination of glazing frames and stops with glass and glazing requirements.

1.4 QUALITY ASSURANCE

- A. Provide doors and frames complying with ANSI A250.8 and as specified in this section.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver metal work in cartons or crates to provide protection during transit and job storage. Provide additional sealed plastic wrapping for factory finished doors.
- B. Inspect metal work upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to Engineer; otherwise, remove and replace damaged items as directed.
- C. Store doors and frames at building site under cover. Place units on minimum 4 inch high wood blocking. Avoid using non-vented plastic or canvas shelters that could create a humidity chamber. If door packaging becomes wet, remove carton immediately. Provide ¼ inch spaces between stacked doors to promote air circulation.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Manufacturer – Subject to compliance with requirements, provide products by one of the following:
 - 1. Ceko Door Products
 - 2. Curries Mfg., Inc.
 - 3. E.H. Frederick Co.
 - 4. The Philipp Manufacturing Co.
 - 5. Pioneer Industries, Inc.
 - 6. or equal.

2.2 MATERIALS

- A. Hot-Rolled Steel Sheets and Strip – Commercial quality carbon steel, pickled and oiled, complying with ASTM A1011 and ASTM A568.
- B. Cold-Rolled Steel Sheets – Commercial quality carbon steel, complying with ASTM A1008 and ASTM A568.
- C. Galvanized Steel Sheets – Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A90 and ASTM A653, G60 zinc coating, mill phosphatized.

2.3 STEEL DOORS AND FRAMES FABRICATION, GENERAL

- A. Fabricate steel door and frame units to be rigid, neat in appearance and free from defects, warp or buckle. Wherever practicable, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at project site. Comply with ANSI A250.8 Level 3, extra heavy-duty, Model 3 or 4, minimum 14-gauge faces for doors and 14 gauge for frames.
- B. Fabricate frames, concealed stiffeners reinforcement, edge channels and moldings from either cold-rolled or hot-rolled steel (at fabricator's option).
- C. Fabricate doors, panels, and frames from galvanized sheet steel. Close top and bottom edges of exterior doors as integral part of door construction or by addition of minimum 16-gauge inverted steel channels.
- D. Exposed Fasteners – Unless otherwise indicated, provide countersunk flat Phillips heads for exposed screws and bolts.
- E. Thermal-Rated (Insulating) Assemblies – Provide doors which have been fabricated as thermal insulating door and frame assemblies and tested in accordance with ASTM C236. Unless otherwise indicated, provide thermal-rated assemblies with U factor of 0.24 Btu/(hr, x ft² x °F)
- F. Fire-Rated Door Assemblies – Where fire-rated door assemblies are indicated or required, provide fire-rated door and assemblies that comply with NFPA 80 "Standard for Fire Doors and Windows", and have been tested, listed, and labeled in accordance with ASTM E2074 "Standard Methods of Fire Tests of Door Assemblies" by a nationally recognized independent testing and inspection agency acceptable to authorities having jurisdiction.
- G. Finish Hardware Preparation – Prepare doors and frames to receive mortised and concealed finish hardware in accordance with Section 08710 and final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 series specifications for door and frame preparation for hardware.
- H. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site.
- I. Locate finish hardware as indicated on final shop drawings or, if not shown, in accordance with "Recommended Locations for Builder's Hardware", published by the Door and Hardware Institute.

2.4 STANDARD STEEL FRAMES

- A. Provide metal frames for doors, transoms, sidelights, borrowed lights, and other openings, of types and styles as shown on Drawings and schedules. Conceal fastenings, unless otherwise indicated. Fabricate frames of minimum 14-gauge cold-rolled furniture steel. Fabricate frames with mitered and welded corners.
- B. Door Silencers – Except on weather-stripped frames, drill stops to receive 3 silencers on strike jambs of single-swing frames and 2 silencers on heads of double-swing frames.
- C. Plaster Guards – Provide 26-gauge steel plaster guards or mortar boxes, welded to frame, at back of finish hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.

2.5 SURFACE PREPARATION AND PAINTING

- A. Surface preparation and prime painting is provided under this Section. Prime paint shall conform to the requirements and be of the same manufacturer as that provided under Section 09900 – Painting. Finish painting is included under Section 09900.

PART 3 EXECUTION

3.1 INSTALLATION

- A. General – Install standard steel doors, frames, and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.
- B. Placing Frames – Comply with provisions of SDI-105 "Recommended Erection Instructions For Steel Frames", unless otherwise indicated.
 - 1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.
 - 2. In masonry construction, locate 3 wall anchors per jamb at hinge and strike levels.
 - 3. At poured-in-place concrete or masonry construction, set frames and secure to adjacent construction with machine screws and masonry anchorage devices.
 - 4. Install fire-rated door frames in accordance with NFPA Std. No. 80.
 - 5. In metal stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In open steel stud partitions, place studs in wall anchor notches and wire tie. In closed steel stud partitions, attach wall anchors to studs with tapping screws.
- C. Door Installation: Fit hollow metal doors accurately in frames, within clearances specified in ANSI A250.8:
 - 1. Place fire-rated doors with clearances as specified in NFPA Standard No. 80.

3.2 ADJUST AND CLEAN

- A. Prime Coat Touch-up – Immediately after erection, touch-up prime coat as specified in Section 09900 – Painting.

- B. Protection Removal – Immediately prior to final inspection, remove protection plastic wrappings from prefinished doors.
- C. Final Adjustments – Check and re-adjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operating conditions.

END OF SECTION

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SECTION 08310

ACCESS HATCHES AND PANELS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Single door hatches and frames
 - 2. Double door hatches and frames
- B. Related Sections
 - 1. Section 03300 - Cast-in-Place Concrete
 - 2. Section 03485 - Precast Concrete Structures
 - 3. Section 09900 - Painting

1.2 REFERENCES

- A. ASTM A36 - Standard Specification for Carbon Structural Steel
- B. OSHA 29 CFR Part 1910.27 - Fixed Ladders
- C. OSHA 29 CFR 1910.23 - Fall Protection in General Industry

1.3 SUBMITTALS

- A. Product Data - Submit manufacturer's product data, roughing in diagrams, and installation instructions for each type and size of hatch. Provide operating instructions and maintenance information.
- B. Shop Drawings - Submit shop drawings for special components and installations which are not fully dimensioned or detailed on manufacturer's data sheets.

1.4 HANDLING

- A. Deliver materials in manufacturer's original packaging.
- B. Store materials in a dry, protected, well-vented area. Thoroughly inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.
- C. Handle and stack materials carefully to prevent deformation or damage.
- D. Store materials carefully on substantial timbers and blocking, so arranged that materials will be free from earth and properly drained, preventing any splattering with dirt or accumulation of water or snow in or about materials.
- E. Prevent accumulation of mud, dirt, or other foreign matter on materials. Any accumulation shall be completely removed prior to erection.
- F. Protect painted, hot-dip galvanized, and other finishes from damage due to metal banding and rough handling. Use padded slings and strips.

- G. Remove protective wrapping immediately after installation (if applicable).

1.5 JOB CONDITIONS

- A. Verify that other trades with related work are completed before installation.
- B. Mounting surfaces shall be straight and secure; substrates shall be of proper width.
- C. Coordinate installation with other trades before starting.
- D. Refer to the construction documents, shop drawings, and manufacturer's installation instructions.
- E. Hatch installation should be coordinated with the precast concrete structure manufacturer and hatch frames should be cast into the structures.

1.6 WARRANTY/GUARANTEE

- A. Manufacturer's standard warranty: Materials shall be free of defects in material and workmanship for a period of 5 years from the date of substantial completion.

1.7 QUALITY ASSURANCE

- A. Castings shall be smooth, free of blowholes, and imperfections. Hinges and latches shall act freely and without binding.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. The Bilco Company; New Haven, CT
- B. Milcor, Inc.; Lima, OH
- C. U.S.F. Fabrication; Hialeah, FL, or
- D. Halliday Products, Orlando, FL
- E. Approved equal.

2.2 HATCHES - GENERAL

- A. Where indicated on the Drawings, provide prefabricated floor hatches.
- B. Aluminum door leaf shall be ¼ inch thick minimum with diamond plate cover. Frame shall be ¼ inch thick minimum angle with anchors as per manufacturer's recommendation.
- C. Doors shall be equipped with stainless steel tamper proof hinges and 5/16 inch diameter minimum stainless steel pins.
- D. Hinges, latches, hasps, handles and all miscellaneous hardware shall be stainless steel.
- E. Hatch shall be coated with a bitumastic coating at all locations coming in contact with concrete.
- F. Door lock shall be operable from both sides of the hatch. Provide a snap lock with removable handle.

- G. Doors shall be equipped with flush stainless steel drop handle that does not protrude above the cover.
- H. Doors shall be equipped with an automatic hold-open arm complete with vinyl grip handle to permit easy one hand release.
- I. The hatch surface shall be smooth as to not cause a tripping hazard.
- J. All hooks, anchor bolts, angles and all miscellaneous hardware shall be Type 316 stainless steel.
- K. All hatches shall be equipped with a fall protection grating system as specified in Paragraph 2.5.
- L. Hatch shall be reinforced and rated for 300 psf loading with maximum deflection of L/150 of the span.
- M. The hatch shall have a drainable frame.
- N. The hatch shall be equipped with a ladder-up with double safety post for the valve vault.
- O. The hatch shall be watertight.
- P. Hatches shall be rated for ASSHTO H-20 loading.

2.3 FALL PROTECTION GRATING SYSTEM

- A. Furnish and install, fall protection grating system. Door manufacturer shall install the grating system when the door is fabricated. If field installation is necessary, grating system shall be installed per the Manufacturer's instructions.
- B. Performance characteristics:
 - 1. Grating panels shall be high visibility safety orange in color.
 - 2. Grating panels shall lock automatically in the full open position.
 - 3. Grating system shall have a twenty-five year warranty.
 - 4. Grating panels shall have a provision for locking to prevent unauthorized opening.
- C. Grating: Panels shall be aluminum and designed to meet OSHA 29 CFR 1910.23 requirements for fall protection.
- D. Hold open feature: A Type 316 stainless hold open device shall be provided to lock the cover in the fully open 90 degree position.
- E. Hardware: All hardware shall be Type 316 stainless steel.

2.4 HATCH SCHEDULE

Location	Size	Quantity
Wet Well	96" x 48"	1
Valve Vault	48" x 36"	1

EXECUTION**2.5 FIELD INSTALLATION**

- A. Hatches shall be installed where indicated in accordance with manufacturer's printed instructions and approved submittals.
- B. Hatches shall be cast into concrete. Coordinate with the requirements of Section 03300 and 03485.
- C. Submit product design drawings for review and approval to the Engineer before fabrication.
- D. Hatches shall be free from binding.

2.6 SURFACE PREPARATION AND PAINTING

- A. Provide surface preparation and prime paint in accordance with Section 09900, of all ferrous and galvanized surfaces.
- B. Finish painting is the work of Section 09900.

END OF SECTION

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SECTION 08710

DOOR HARDWARE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Finish hardware including the following:
 - a. Hinges and butts.
 - b. Lock cylinders and keying.
 - c. Locks, latches, and bolts.
 - d. Closers and door control devices.
 - e. Door trim units.
 - f. Weatherstripping.
 - g. Thresholds.
 - h. Protection plates.
 - i. Silencers.

1.2 REFERENCES

- A. ANSI/BHMA A156 series.
- B. ADA Accessibility Guidelines for Buildings and Facilities.
- C. Door and Hardware Institute - Recommended Locations for Builders' Hardware.

1.3 QUALITY ASSURANCE

- A. Manufacturer - Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from only one manufacturer (except where noted in the Schedule), although several may be indicated as offering products complying with requirements.
- B. Comply with all Federal, State, and Local Codes for handicap accessibility.

1.4 SUBMITTALS

- A. Product Data - Submit manufacturers' technical product data for each item of hardware. Include whatever information may be necessary to show compliance with requirements, and include instructions for installation and for maintenance of operating parts and finish.
- B. Hardware Schedule - Submit final hardware schedule in manner indicated below. Coordinate hardware with doors, frames and related work to ensure proper size, thickness, hand function and finish of hardware.
 1. Final Hardware Schedule Content - Based on finish hardware indicated, organize hardware schedule into "hardware sets" indicating complete

designations of every item required for each door or opening. Include the following information:

- a. Type, style, function, size and finish of each hardware item.
 - b. Name and manufacturer of each item.
 - c. Catalog cuts of each item.
 - d. Fastenings and other pertinent information.
 - e. Location of hardware set cross-referenced to indications on Drawings both on floor plans and in door schedule.
 - f. Explanation of all abbreviations, symbols, codes, etc. contained in schedule.
 - g. Mounting locations for hardware.
 - h. Door and frame sizes and materials.
- C. Submittal Sequence - Submit schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work (e.g., hollow metal frames) which is critical in the project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by finish hardware, and other information essential to the coordinated review of the hardware schedule.
1. Keying Schedule - Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks have been fulfilled.
- D. Samples - Prior to submittal of the final hardware schedule and prior to final ordering of finish hardware upon request of Engineer, submit one sample of each type of exposed hardware unit, finished as required, and tagged with full description for coordination with schedule.
1. Samples will be returned to the supplier. Units which are acceptable and remain undamaged through submittal, review and field comparison procedures may, after final check of operation, be used in the work, within limitations of keying coordination requirements.
- E. Templates - Furnish hardware templates to each fabricator of doors, frames and other work to be factory-prepared for the installation of hardware. Upon request, check shop drawings of such other work, to confirm that adequate provisions are made for proper location and installation of hardware.

1.5 PRODUCT HANDLING

- A. Tag each item or package separately, with identification related to final hardware schedule, and include basic installation instructions with each item or package.
- B. Packaging of hardware is the responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.

- C. Inventory hardware jointly with representatives of the hardware supplier and the hardware installer until each is satisfied that the count is correct.
- D. Deliver individually packaged hardware items at the proper times to the proper locations (shop or project site) for installation.
- E. Provide secure lock-up for hardware delivered to the project, but not yet installed. Control handling and installation of hardware items which are not immediately replaceable, so that completion of the work will not be delayed by hardware losses, both before and after installation.

1.6 KEY CONTROL SYSTEM

- A. Provide hardware and keys compatible with Owners existing key control system.

PART 2 PRODUCTS

2.1 GENERAL

- A. Coordinate all hardware with the Engineer.
- B. Hand of Door - Drawings show direction of swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.
- C. Manufacturer's Name Plate - Do not use manufacturer's products which have manufacturer's name or trade name displayed in a visible location (omit removable nameplates), except in conjunction with required UL labels and as otherwise acceptable to Engineer.
 - 1. Manufacturer's identification will be permitted on rim of lock cylinders only.
- D. Base Metals - Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper and hardness, but in no case of lesser (commercially recognized) quality than specified for the applicable hardware units by applicable ANSI/BHMA A156 series standard for each type hardware item and with ANSI/BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise approved.
- E. Fasteners - Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.
- F. Furnish screws for installation, with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of such other work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.
- G. Provide concealed fasteners for hardware units that are exposed when door is closed, except to the extent that no standard units of the type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on the opposite face is exposed in other work, except where it is not feasible to adequately

reinforce the work. In such cases, provide sleeves for each thru-bolt or use hexscrew fasteners.

- H. Tools and Maintenance Instructions for Maintenance - Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of finish hardware.

- I. Hardware Finishes

1. Provide matching finishes for hardware units at each door or opening, to the greatest extent possible, and except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening. In general, match items to the manufacturer's standard finish for the latch and lock set for color and texture.
2. Provide finishes that match those established by BHMA.
3. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness and other qualities complying with manufacturer's standards, but in no case less than specified for the applicable units of hardware by referenced standards.
4. Provide protective lacquer coating on all exposed hardware finishes of brass, bronze and aluminum, except as otherwise indicated. The suffix "-NL" is used with standard finish designations to indicate "no lacquer".
5. The designations used in schedules and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18, Materials & Finishes Standard, including coordination with the traditional US finishes shown by certain manufacturers for their products.

2.2 ACCEPTABLE MANUFACTURERS

- A. Hinges and Butts - Hager Companies, Lawrence Hardware, Pemko Manufacturing Company, Stanley, or equal.
- B. Locks - Sargent, Schlage, Yale, or equal.
- C. Kickplates/Armorplates - Baldwin, Brookline, Cipco, Hiawatha, Liberty, Rockwood, Corbin-Russwin, or equal.
- D. Overhead Closers - Corbin-Russwin, Dorma, LCN, Sargent, Yale, or equal.
- E. Door Trim Units - Baldwin, Brookline, Rockwood, or equal.
- F. Door Stripping and Seals - National Guard, Pemko, Reese, Zero, or equal.
- G. Thresholds - National Guard, Pemko, Reese, Zero, or equal.
- H. Exit Devices - Corbin-Russwin, Sargent, Yale, or equal.

2.3 HINGES AND BUTTS

- A. Comply with ANSI/BHMA A156.1
- B. Templates - Provide only template-produced units.

- C. Screws - Furnish Phillips flat-head or machine screws for installation of units. Finish screw heads to match surface of hinges or pivots.
- D. Hinge Pins - Except as otherwise indicated, provide hinge pins as follows:
 - 1. Steel Hinges - Steel pins.
 - 2. Exterior Doors - Non-removable pins.
 - 3. Out-swing Corridor Doors - Non-removable pins.
 - 4. Interior Doors - Non-rising pins.
 - 5. Tips - Flat button and matching plug, finished to match leaves.
 - 6. Number of Hinges - Provide number of hinges indicated but not less than 3 hinges per door leaf for doors 90-inches or less in height and one additional hinge for each 30-inches of additional height.
- E. Provide Stanley Model No. FBB199 - US32D, 4½ by 4½ inch hinges, or equal.

2.4 LOCK CYLINDERS AND KEYING

- A. General - Meet with the Engineer and Owner to finalize keying requirements and obtain final instructions in writing.
- B. Metals - Construct lock cylinder parts from brass/bronze, stainless steel and nickel silver.
- C. Comply with Engineer's instructions for masterkeying and, except as otherwise indicated, provide individual change key for each lock which is not designated to be keyed alike with a group of related locks.
 - 1. Permanently inscribe each key with number or lock that identifies cylinder manufacturer key symbol, and notation "DO NOT DUPLICATE".
- D. Key Material - Provide keys of nickel silver only.
- E. Key quantity - Furnish 5 change keys for each lock; 5 master keys for each master system; and 5 grandmaster keys for each grandmaster system.
 - 1. Deliver keys to Owner.
 - 2. Furnish 5 construction master keys.
- F. Equip all locks with interchangeable cores constructed of solid brass for final and construction cores.

2.5 LOCKS, LATCHES AND BOLTS

- A. Cylindrical Locks - Comply with ANSI/BHMA 156.2 Series 4000 Grade 1.
- B. Mortise Locks - Comply with ANSI/BHMA A156.13 Series 1000 Grade 1 operational, Grade 3 security.
- C. Strikes - Provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame, finished to match hardware set.

1. Provide dust-proof strikes for foot bolts, except where special threshold construction provides non-recessed strike for bolt.
 2. Provide roller type strikes where recommended by manufacturer of the latch and lock units.
- D. Lock Throw - Provide 5/8 inch minimum throw of latch and deadbolt used on pairs of doors.
1. Provide ½ inch minimum throw on other latch and deadlock bolts.
- E. Rabbeted Doors - Where rabbeted door stiles are indicated, provide special rabbeted front on lock and latch units and bolts.
- F. Exit devices comply with ANSI/BHMA A156.3.
- G. For exterior double doors, provide Sargent Model No. 8713 ETL – US32D lockset/exit device, equal by Corbin-Russwin, or equal.
- H. Provide Ives Model No. 458 flush bolt, Hager Model 282 D, or equal.

2.6 CLOSERS AND DOOR CONTROL DEVICES

- A. Door control devices comply with ANSI/BHMA A156.4.
- B. Size of Units - Except as otherwise specifically indicated, comply with the manufacturer's recommendations for size of door control unit, depending upon size of door, exposure to weather and anticipated frequency of use.
1. Provide regular arms for all overhead closers, except as otherwise indicated.
 2. Provide closers with reduced opening force for all handicap accessible doors.
 3. Provide closers with stops where door stops are not indicated or appropriate.
- C. Provide grey resilient parts for exposed bumpers.
- D. Provide Yale Security Inc. Model No. 3521, 3501, PA3521, or PA3501 door closer, equal by Sargent, or equal. See door hardware sets for particular application. All closers should be US32D finish.
- E. Provide Rockwood Model No. 440 floor stop, or equal.
- F. Provide Rockwood Model No. 400 wall stop, or equal.
- G. Provide Rockwood Model No. 461 kick down door stop, or equal.
- H. Provide Ives Model No. 20 door silencer, or equal
- I. Provide Ives Model No. 180 lockguard, equal by Hager, or equal.

2.7 DOOR TRIM UNITS

- A. Fasteners - Provide manufacturer's standard exposed fasteners for door trim units (push plates, pull plates, kick plates, edge trim, and similar units); either machine screws or self-taping screws.

- B. Fabricate protection plates (armor, kick or mop) not more than 1½ inch less than door width on stop side and not more than ½ inch less than door width on pull side, by 16 inches high or as otherwise indicated on the Finish Hardware Schedule.
 - 1. Metal Plates - Stainless steel, 0.050 inch (US 18 ga.).
 - 2. Plastic Plates - ¼ inch thick, beveled on 4 edges.
- C. Provide Rockwood Model No. 70C, 4 inch by 16 inch SS push plate, or equal.
- D. Provide Rockwood Model No. 107 x 70C SS pull plate, or equal.

2.8 WEATHERSTRIPPING

- A. Provide continuous weatherstripping at each edge of every exterior door leaf. Provide non-corrosive fasteners as recommended by manufacturer for application indicated.
- B. Replaceable Seal Strips - Provide only those units where resilient or flexible seal strip is easily replaceable and readily available from stocks maintained by manufacturer.
- C. Weatherstripping at Jambs and Heads:
 - 1. Provide bumper-type resilient insert and metal retainer strips, surface-applied unless shown as mortised or semi-mortise, of following metal, finish and resilient bumper material:
 - 2. Extruded aluminum with natural anodized finish; 0.062 inch minimum thickness of main walls and flanges.
 - 3. Extruded bronze (brass), finish to match door/frames, 0.05 inch minimum thickness of main walls and flanges.
 - 4. Provide Pemko Model No. 305CR weatherstrip, National Guard Products Model 140PA, or equal.
- D. Weatherstripping at Door Bottoms
 - 1. Provide threshold consisting of contact type resilient insert and metal housing of design and size shown; of following metal, finish, and resilient seal strip:
 - a. Extruded aluminum with natural anodized finish; 0.062 inch minimum thickness of main walls and flanges.
 - b. Solid neoprene wiper or sweep seal complying with MIL R 6055, Class II, Grade 40.
 - c. Provide Pemko Model No. 315CN door bottom sweep, equal by National Guard Products, or equal.
- E. Astragals
 - 1. Provide Pemko Model No. 357C astragal, or equal.

2.9 THRESHOLDS

- A. General - Except as otherwise indicated provide standard aluminum threshold unit of type, size and profile as shown or scheduled.

- B. Exterior Hinged/Pivoted Doors - Provide units not less than the width of the door frame, formed to accommodate change in floor elevation where indicated, fabricated to accommodate door hardware and to fit door frames, and as follows:
 - 1. For out-swinging doors provide rabbeted type units with replaceable weatherstrip insert in stop.
- C. Provide Pemko Model No. 172A threshold, Reese Model S426A, or equal.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations of "ADA Accessibility Guidelines for Buildings and Facilities - Federal Register/Vol. 56, No. 144, 7-26-91", and except as may be otherwise directed by the Engineer.
- B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface projections with finishing work specified under other specifications. Do not install surface-mounted items until finishes have been completed on the substrate.
- C. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- D. Drill and countersink units that are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- E. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant.

3.2 ADJUST AND CLEAN

- A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as indicated for the application made. Clean adjacent surfaces soiled by hardware installation.
- B. Final Adjustment - Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- C. Instruct Owner's personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.

3.3 FINISH HARDWARE SCHEDULE

- A. Manufacturer's names and specific hardware models are designated in section 2 and in the hardware sets to indicate type and quality of hardware items required for each

type of door indicated. However, the Contractor is not limited to the specific manufacturers listed in the specification for each hardware set.

- B. Refer to the list of acceptable manufacturers listed previously for each door hardware item.

HW-1 (Exterior Double Door)

3 pr.	Hinges
1	Lockset/Exit Device
1	Threshold
2	Door Bottom Sweep
2 sets	Weatherstrip
2	Closer - No. PA3521xUS32D - Yale
2	Kick Plate
2	Flush bolts
1	Astragal
2	Kick Down Holder

END OF SECTION

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SECTION 09900

PAINTING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Surface preparation and application of coatings.

B. Related Sections

1. Section 15075- Mechanical Identification

1.2 REFERENCES

A. The Society for Protective Coatings (SSPC):

1. Surface Preparation Specifications
 - a. SP-1 - Solvent Cleaning
 - b. SP-2 - Hand Tool Cleaning
 - c. SP-3 - Power Tool Cleaning
 - d. SP-5 - White Metal Blast Cleaning
 - e. SP-6 - Commercial Blast Cleaning
 - f. SP-7 - Brush-Off Blast Cleaning
 - g. SP-10 - Near-White Blast Cleaning
 - h. SP-13 - Surface Preparation of Concrete
2. SP-16 - Brush Off Blast of Galvanized and Non-Ferrous Metals
3. National Association of Pipe Fabricators (NAPF):
 - a. NAPF 500-03-01 - Solvent Cleaning
 - b. NAPF 500-03-02 - Hand Tool Cleaning
 - c. NAPF 500-03-03 - Power Tool Cleaning
 - d. NAPF 500-03-04 - Abrasive Blast Cleaning for Ductile Iron Pipe
 - e. NAPF 500-03-05 - Abrasive Blast Cleaning for Cast Ductile Iron Pipe
4. SSPC-PA 1 - Shop, Field and Maintenance Painting
5. SSPC-PA 2 - Measurement of Dry Coating Thickness with Magnetic Gages
6. SSPC Visual Standards SSPC VIS 1-89

7. SSPC Guide 4 – Guide to Maintenance Repainting with Oil Base or Alkyd Painting Systems
 8. SSPC Guide 6 – Guide for Containing Debris Generated During Paint Removal Operations
- B. Occupational Safety and Health Administration (OSHA) Standards
- C. American Society for Testing and Materials (ASTM)
1. ASTM D4263 – Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
 2. ASTM F1869 – Standard Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
- D. National Association of Pipe Fabricators (NAPF)
1. NAPF 500-03 - Surface Preparation Standard for Ductile Iron Pipe and Fittings In Exposed Locations Receiving Special External Coatings and/or Special Internal Linings
- E. International Concrete Repair Institute (ICRI)
1. ICRI 310 - Selecting And Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair

1.3 SCOPE OF WORK

- A. Items of work include but are not limited to the surface preparation and coating of the following:
1. Aluminum and steel in contact with or embedded in concrete
 2. Ferrous metal equipment provided by the Contractor and non-insulated ferrous metal ductwork
 3. Exposed exterior piping
 4. Interior piping, fittings and valves with the exception of plastic and stainless steel, unless noted otherwise
 5. Touch-up painting of shop primers
 6. Wetwell Piping (H2S resistant coating required)
 7. Valve vault piping
 8. Mechanical equipment not painted by the manufacturer
 9. Items listed to be painted in the interior finish schedule and on Drawings
 10. Exposed electrical conduit, conduit fittings, and outlet boxes
 11. Concrete, at the locations specified on the Drawings
 12. Galvanized metal, at the locations specified on the Drawings.

- B. Coatings are not required for glass, stainless steel, chrome, cadmium plate or aluminum that is not in contact with concrete.
- C. Ventilation, dehumidification, and temperature control equipment required to provide and maintain the proper environment for worker protection and for coating application and curing.
- D. The Contractor shall furnish to the Owner, at no charge, for use duration of this Project, dry film thickness gauge, wet film thickness gauge, adhesion testing, surface preparation testing, temperature / climate condition detectors, electrical flaw gauge and / or holiday detection equipment.

1.4 SUBMITTALS

- A. List of coating products and systems proposed, giving brand, type and manufacturer.
- B. Product for product listing of the manufacturer's coating system showing a comparison with the specified coating systems in Schedules 09900-A and 09900-B.
- C. Manufacturer's current printed recommendations and product data sheets for each system, and ASTM performance criteria.
- D. Paint manufacturer's compatibility guide, to be a complete listing of all compatible paint systems/combinations produced by the paint manufacturer.
- E. Copies of manufacturer's complete color charts for each coating system.
- F. When requested by the Engineer, provide product container labels and labeled mixing instructions for products utilized in the Work.
- G. Ventilating plan describing procedures and equipment that will be used.
- H. Method to be used, and the size and type of abrasive media to be used for the abrasive blast cleaning.
- I. Method and equipment to be used for temperature control.

1.5 QUALITY ASSURANCE

- A. Use adequate number of skilled workmen who are trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods required for proper performance of the work in this Section.
- B. Applicator Qualifications – Minimum 5 years experience in application of specified products.
- C. Regulatory Requirements – Meet federal, state and local requirements limiting the emission of volatile organic compounds.
- D. A qualified and experienced representative of the paint manufacturer shall meet with Contractor and Engineer to coordinate items requiring painting and to schedule the Work. Monthly field visits shall occur to ensure proper application of the painting system. The Contractor shall coordinate with the paint manufacturer to schedule site visits.

- E. Use equipment of adequate size, capacity, and quantity to accomplish the work of this Section in a timely manner.
- F. For coatings specified as H₂S resistant in the schedule, applicator shall establish quality control procedures and practices to monitor phases of surface preparation, storage, mixing, application, and inspection throughout the duration of the Project. Contractor shall provide a full-time, on-site person whose dedicated responsibilities will include quality control of the corrosion protection linings.

1.6 DELIVERY, HANDLING, STORAGE AND PROTECTION

- A. Deliver materials to painter's area in original, unbroken, containers with name and analysis of product, manufacturer's name, and shelf life date. Do not use or retain contaminated, outdated, prematurely opened, or diluted materials.
- B. Storage of materials shall be in accordance with the paint manufacturer's recommendations.
- C. Store coated items carefully. Store paints and painter's materials only in areas designated solely for this purpose. Avoid damaging or dirtying coatings by contact with soil, pavement or other harmful materials that might necessitate special cleaning. Use suitable blocking during storage.
- D. Confine mixing, thinning, clean-up and associated operations, and storage of painting debris before authorized disposal, to these areas.
- E. Do not expose primed surfaces to weather for more than six months before top coating. Allow less time if recommended by coating manufacturer.
- F. Do not use plumbing fixtures, piping or mechanical equipment for mixing or disposal of paint materials.
- G. Store waste temporarily in closed, nonflammable containers until final disposal. Keep no rubbish in painter's area longer than 24 hours. Finally, dispose of waste in an approved disposal system.
- H. During surface preparation, cleaning and painting operations, protect all surfaces not to be painted.
- I. Protect coated items, whether prime or finish, from damage due to shipping and handling. Use padding, blocking, fabric slings and extra care as required.
- J. Upon completion of field painting, ensure coatings are undamaged and in good condition. Repair damaged or deteriorated coating, resulting from failure to observe foregoing requirements.

1.7 PROJECT/SITE CONDITIONS

- A. Environmental Requirements:
 - 1. Comply with manufacturer's recommendations as to environmental conditions under which coatings and coating systems can be applied.
 - 2. Do not apply coatings when dust is being generated.

- B. Cover or otherwise protect work by other trades and surfaces not being painted during all painting operations.
- C. All shop primed ferrous metals shall be primed using the same coatings specified in the paint schedule.

1.8 EXTRA MATERIALS

A. Environmental Requirements:

1. Comply with manufacturer's recommendations as to environmental conditions under which coatings and coatings systems can be applied.
2. Do not apply coatings when dust is being generated.

B. Cover or otherwise protect work by other trades and surfaces not being painted during all painting operations.

C. All ship primed ferrous metals shall be primed using the same coatings specified in the paint schedule.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Coating systems are designated by reference to Themec Company, Inc. and Sherman Williams products to establish the type and quality required. Equal products as manufactured by International Protective Coatings, PPG Industries, Carboline Company or equal will be considered if provided with a "Product for Product" listing with the submittal. The Engineer reserves the right to request and receive detailed technical literature of each proposed coating system before approval.

B. No coating systems will be considered that decrease the film thickness, decrease the number of coats, decrease the effectiveness of the surface preparation or change the type of coating specified in the schedule of this section.

2.2 MATERIALS, GENERAL

A. Paint Coatings - Suitable for intended use, recommended by their manufacturer for intended service. All coatings, unless otherwise specified, shall be suitable for severe service.

B. Products Used - Minimum of five years satisfactory use under similar service conditions.

C. Use products of one manufacturer in any one paint coating system; all coating materials compatible. Coatings for touch-up - same as original.

D. Equipment prime or finish painted by the equipment manufacturer shall be painted in strict accordance with this Section and the equipment's individual specification section.

E. Bear entire responsibility in providing complete compatibility of all shop and field painting systems.

F. It is recognized that the specific application of the coating products varies for each specific manufacturer (number of coats, mil thickness per coat, etc.). Therefore, these Specifications represent the minimum to be provided under this contract and shall be increased in accordance with each manufacturer's recommendations.

2.3 COLORS AND FINISHES

- A. All finish colors will be selected from manufacturer's color chips. The Owner will select the colors. Match final colors to selected color chips, as scheduled.
- B. To provide contrast between successive coats, lightly tint each coat to distinguish it from preceding coats.
- C. Unless otherwise indicated, use gloss or semi-gloss for finish paint.

2.4 COATING TYPES

- A. Coating types and minimum acceptable percent (by volume) of component solids are described in Schedule 09900-A Coating Types. Description of coating systems including surface preparation and dry film thicknesses are included in Schedule 09900-B Coating Systems.

PART 3 EXECUTION

3.1 GENERAL

- A. Examine surfaces scheduled to receive paint and finishes for conditions that will adversely affect execution, permanence or quality of work and which cannot be put into an acceptable condition through preparatory work.
- B. Do not proceed with surface preparation or coating application until conditions are suitable.
- C. The following shop and field instruments shall be used to inspect surface preparation and dry film thickness.
 - 1. SSPC visual standards SSPC-VIS 1-89
 - 2. Testex Press-O-Film replica type x-coarse
 - 3. Surface temperature thermometer
 - 4. Sling psychrometer and psychrometric tables
 - 5. Type I or Type II dry film thickness gauges
 - 6. SSPC-PA2 methods

3.2 PREPARATION

- A. Basic Steps
 - 1. Arrange to do all preparation and paint work in heated enclosure unless ambient weather conditions ensure still, dry air and a minimum of 50 degree F temperature. Do not apply paints to surfaces in direct sunlight.
 - 2. Coordinate cleaning and painting operations to eliminate contamination of one by the other.
 - 3. Maintain all coating materials at manufacturer's recommended mixing and application temperatures for not less than 24 hours before use. Have clean, proper containers, spray equipment, applicators and accessory items ready for use before decanting or mixing paint materials.

4. Ensure proper coordination of materials to be applied hereunder with previous coatings on affected surfaces. Have all manufacturer's written directions on hand, and follow them strictly, except where otherwise specified.
 5. Carefully coordinate preparation and material compatibility requirements of paint systems used by manufacturers to shop prime equipment.
- B. Before any paint application, carefully clean all surfaces to be coated of dust, dirt, grease, rust, mill scale, paint unsuitable for top coatings, efflorescence, oil, moisture, foreign matter or conditions detrimental to coating bond and durability.
1. Following cleaning, apply preparatory treatment in strict accordance with manufacturer's written instructions.
 2. Fill imperfections and holes in surfaces to be painted.
- C. Metals
1. Prepare all field and shop primed ferrous metals, including galvanized ferrous metals, in accordance with Schedule 09900-B Coating System Schedule included under this Section.
 2. A needle gun may be used for field welds and shop welds which occur in narrow, unprimed areas in an otherwise shop primed surface.
 3. Bituminous coated metals for paint finish - clean of all dirt, grease, oil and foreign matter, and prime with a barrier coat to seal the bitumen and prevent bleeding and discoloration of finish.
 4. Prepare non-ferrous and galvanized metal surfaces for finishing in accordance with SSPC-SP16 Brush-Off Blast Cleaning of Coated and Uncoated Galvanized Steels, Stainless Steels and Non-Ferrous Metals. Provide minimum uniform anchor profile of 1 mil. Apply coatings as outlined on the Paint Schedule.
- D. Provide higher degree of cleaning for acceptable equivalent paint products when paint manufacturer recommends in his printed surface preparation recommendations.
- E. Concrete for Paint Finishes
1. Clean thoroughly of all form oil, release agents, dirt, dust, grease, paint, loose material and foreign matter. Remove laitance; roughen smooth surfaces by brush sand blasting in accordance with SSPC-SP13 Surface Preparation of Concrete (Reference ICRI CSP 3-5 visual standards).
 2. After concrete has dried, prime where required in strict accordance with manufacturer's printed instructions.
 3. Concrete Floors - Prepare all surfaces in accordance with SSPC-SP13 Surface Preparation of Concrete utilizing Shot-Blasting or Mechanical surface preparation. Reference (ICRI CSP- 3-5 visual standards). Acid washing is not permitted.

4. Concrete for submerged service: Prepare all surfaces via abrasive blast cleaning in accordance with SSPC-SP13 Surface Preparation of Concrete. Reference (ICRI CSP- 3-5 visual standards). Acid washing is not permitted.
- F. Concrete masonry units for paint finishes:
 1. Clean thoroughly by brushing, scraping and sanding or grinding slick areas.
 2. Solvent wash oil, grease, and paint spots before applying block filler.
- G. Before applying field coat, touch-up abraded areas of shop coats with paint of the same type. Apply an entire coat if necessary. Touch-up coats are in addition to, and not a substitute for first field coat. Clean deteriorated surfaces to bare metal before applying touch-up coat.
- H. After installation and before applying field coats, touch-up all scratches and blemishes on equipment, motors, pumps, instrumentation panels, electrical switchgear, and similar items with shop coats, paint filler, enamel or other treatment customary with manufacturer.
- I. After installation, touch up all scratches and blemishes on all steel.

3.3 VENTILATION

- A. Particular care shall be exercised during the cleaning and painting of each room. Means of adequately removing air from each room shall be provided, in order to remove dust and solvent vapors.
- B. During the cleaning and painting operations, the painters shall be provided with proper respiratory protection in accordance with OSHA regulations.
- C. In addition to meeting the minimum requirements listed above, the Contractor shall be responsible for complying with all applicable regulations of the various local, state, and federal agencies.

3.4 TEMPERATURE CONTROL

- A. Auxiliary heat and/or cooling may be necessary to maintain the room temperature at an acceptable level for the coating manufacturer's application parameters. The equipment must be compatible with the required dehumidification equipment and meet the following requirements.
 1. The air from heaters and refrigerant type systems shall be connected to the process air supply duct from the dehumidifier.
 2. Only electric, indirect fired combustion, or steam coil auxiliary heaters may be used. Direct-fired space heaters are not permitted during the blasting, coating or curing phases.
 3. Heaters shall be equipped with controls that automatically turn the heaters off if the airflow is interrupted or the internal temperature exceeds its design temperature or that of the supply duct.

4. The area where dehumidification is introduced shall be sealed to allow the air to escape away from the entry point while maintaining a slight positive pressure unless dust from the operation is hazardous. The design of the filter system, if necessary, shall be such that it does not interfere with the dehumidification equipment's ability to control the dew point and temperature parameters in that space. Do not recirculate the air from the space or from the filtration equipment back through the dehumidifier during the coating application or when solvent vapors are present.
5. Maintain a minimum temperature of 50 degrees F for a minimum of seven (7) days after a coating application.

3.5 APPLICATION

A. Conditions

1. Do not apply paints or other finish to wet or damp surfaces, except in accordance with instructions of manufacturer. Do not apply exterior paint during cold, rainy, or frosty weather, or when temperature is likely to drop to freezing within the paint coatings curing time as specified by the paint manufacturer. Avoid painting of surfaces while they are exposed to direct sunlight.
2. Paint surfaces which have been cleaned, pretreated, or otherwise prepared for painting with first finish coat as soon as practicable after such preparation has been completed, but in any event prior to deterioration of prepared surface.
3. Coat blast cleaned metal surfaces immediately after cleaning, before any rusting or other deterioration or contamination of the surface occurs. Do not coat blast cleaned surfaces later than 8 hours after cleaning under ideal conditions or sooner if conditions are not ideal.
4. Work shall conform to SSPC-PA 1.

B. Methods

1. Prepare surfaces, mix and apply paint materials in strict accordance with manufacturer's printed instructions and recommendations, except where specifically directed otherwise. Control temperature of materials upon mixing and application, surface temperature and condition, thinning and modifying.
2. Protect surfaces to be coated, before, during and after application unless ambient weather conditions are favorable.

C. Workmanship

1. Apply coating materials to meet manufacturer's spreading rate and dry film thickness recommendations. Dry film thicknesses specified are constant for brush, spray, roller or other form of application.
 - a. Control thinning for spray use and to manufacturer's printed instructions, and produce specified dry film thickness on level surfaces, interior and exterior angles.

- b. Record quantities of materials of each type, for each coat used.
- 2. Apply paints and coatings using skilled painters, brushed or rolled or sprayed out carefully to a smooth, even coating without runs or sags. Allow each coat of paint to dry thoroughly, on the surface and throughout the film thickness, before the next coat is applied. High polymer coatings may be exempted from the drying requirement if recoat time is specified by manufacturer.
- 3. Finish surfaces - Uniform in finish and color, and free from flash spots and brush marks.
- 4. Accessory items, finish hardware, lighting fixtures, escutcheons, plates, trim and similar finish items not to be painted: Remove or carefully mask before painting adjacent surfaces; carefully replace and reposition upon completion of adjacent painting and cleaning work.

3.6 PROTECTION, CLEAN-UP

- A. Protect all materials and surfaces painted or coated under this Section, from the time of surface preparation until the final coat has fully dried. Also protect all adjacent work and materials from touch-up painting by the use of sufficient drop cloths during the progress of this work. Upon completion of the work, clean up all paint spots, oil, and stains from floors, glass, hardware, and similar finished items.

3.7 PAINT SCHEDULE

- A. Coordinate, schedule and confirm the various cleaning, touch-up and finishing operations. Ensure the transmission of materials data, color selections and coating system methods between the coating applicators. Take responsibility for not exceeding exposure and recoat time limits.
- B. Color code all piping in accordance with Schedule 09900-C, Color Schedule.

3.8 FACTORY ASSEMBLED EQUIPMENT AND SKID PACKAGES

- A. Painting fabricated ferrous assemblies, frames, supports, skids, vessels, tanks, and OSHA guards shall strictly conform to the requirements of this Section including SSPC-SP6 surface preparation, epoxy primer, and intermediate coats, and a polyurethane topcoat.
- B. Painting of piping shall be in accordance with this section.
- C. The Engineer shall be given a minimum 7 day notice to witness blasting and painting operations.
- D. Painting of electrical components, motors and enclosures shall be manufacturer's standard coating system with a minimum of an industrial grade painting system.
- E. Submit detailed schedule of painting system(s) to be used for all equipment to the Engineer. All schedules shall be provided prior to commencement of all painting operations.
- F. Stainless steel and aluminum are not required to be painted unless it is the manufacturer's standard practice.

3.9 FIELD QUALITY CONTROL

- A. Leave staging and lighting in place until the Engineer has inspected surface or coating. Replace staging removed prior to approval by the Engineer. Provide additional staging and lighting as requested by the Engineer.
- B. Unsatisfactory Application
 - 1. If surface has an improper finish color or insufficient film thickness, clean surface and topcoat with specified paint material to obtain specified color and coverage. Obtain specific surface preparation information from coating manufacturer.
 - 2. Evidence of runs, bridges, shiners, laps or other imperfections is cause for rejection.
 - 3. Repair defects in accordance with written recommendations of coating manufacturer.
- C. Damaged coatings, Pinholes and Holidays
 - 1. Feather edges and repair in accordance with recommendations of paint manufacturer.
 - 2. Hand or power sand visible areas of chipped, peeled or abraded paint, and feather the edges. Follow with primer and finish coat. Depending on the extent of repair and appearance, a finish sanding and topcoat may be required.
 - 3. Apply finish coats, including touchup and damage repair coats in a manner that will present a uniform texture and color-matched appearance.

3.10 FINAL TOUCH-UP

- A. Prior to final completion and acceptance, examine painted and finished surfaces and retouch or refinish as necessary to leave surfaces in perfect condition.
- B. After doors have been fitted and hung, refinish edges, tops and bottoms.

Schedule 09900-A - Coating Types		
Tnemec Company Inc.	Sherwin-Williams	Type of Coating System (Solids Content by Volume)
Series 1026 Enduratone	DTM Acrylic Primer-Finish or Pro Industrial Pro-Cryl Universal Acrylic Primer	Acrylic Emulsion (43.0 ± 2.0%).
Series 20HS Pota-Pox	Macropoxy 646 PW Potable Water Epoxy or Macropoxy 5500 Low VOC Epoxy	Polyamide Epoxy (77.0 ± 2.0%)
Series FC20HS Pota-Pox (Fast Cure)	Macropoxy 646 PW Potable Water Epoxy or Macropoxy 5500 Low VOC Epoxy	Polyamide Epoxy (77.0 ± 2.0%)

Schedule 09900-A - Coating Types		
Series 1029 Enduratone	Sher-Cryl HPA High Performance Acrylic-Semi-Gloss	HDP Acrylic Polymer (40.0 ± 2.0%)
Series 66HS Hi-Build Epoxoline	Macropoxy 5500 Low VOC Epoxy	Polyamide Epoxy (78.0 ± 2.0%)
Series 73 Endura Shield	Acrolon 218 HS Acrylic Polyurethane-Semi-Gloss	Aliphatic Acrylic Polyurethane (58.0 ± 2.0%)
Series 94-H2O Hydro-Zinc	Corothane I Galvapac 2K 100 Zinc Primer (NSF)	Aromatic Urethane, Zinc Rich (63.0 ± 2.0%)
Series 130 Envirofill	Cement Plex 875 Block Filler.	Waterborne Cementitious Acrylic (68.0 ± 2.0%)
Series 151 Elasto-Grip	Preprite ProBlock Interior/Exterior Latex Primer	Waterborne Modified Polyamine Epoxy (17.0 ± 2.0%)
Series 218 MortarClad	Dura-Plate 2300 WB Epoxy Cementitious Resurfacer	Epoxy Modified Concrete (100%)
Series 217 MortarCrete	AW Cook Cement Cemtec MSM Mortar or Rapid Cure Vertical Grade.	Acrylic Modified Cement (100%)
Series 434 PermaShield	DuraPlate 5900 HB Epoxy (formerly Cor-Cote SC Plus) with Type SC aggregate.	Modified Aliphatic Amine Epoxy Mortar (100%)
Series 435 Perma-Glaze	Dura-Plate 5900 HB Epoxy (formely Cor Cote SC Plus).	Modified Polyamine Epoxy (100%)
Series 1 Omnithane	Corothane I Galvapac Two Pack Zinc Primer (NSF).	MIO/Zinc-Filled Urethane (61.0 ± 2.0%)
Series 215 Surfacing Epoxy	Steel Seam FT910 Epoxy Patching and Surfacing Compound.	Modified Polyamine Epoxy (100%)
Series 1528 Endura-Heat DTM	Heat Flex 1200 / Heat Flex 3500	Inert Multipolymeric Matrix (65%)

Schedule 09900-B - Coating Systems				
Surface	System Surface Preparation (Shop/Field)	System Finishes		
		Primer	2nd	Final
		DFT = Dry Film Thickness, Mils		
Ferrous Metals, Interior Non-Submerged	SSPC-SP-6	Series 1 (2.5-3.5 DFT)	Series 66HS (4.0-6.0 DFT)	Series 73 (2.5-5.0 DFT)
		<i>Corothane I</i> <i>Galvapak 2K</i>	<i>Macropoxy 646</i> <i>FC Epoxy</i>	<i>Acrolon 218 HS</i> <i>Polyurethane</i>
Ferrous Metals, Exterior Non-Submerged	SSPC-SP-6	Series 1 (2.5-3.5 DFT)	Series 66HS (3.0-5.0 DFT)	Series 73 (2.5-5.0 DFT)
		<i>Corothane I</i> <i>Galvapak 2K</i>	<i>Macropoxy 646</i> <i>FC Epoxy</i>	<i>Acrolon 218 HS</i> <i>Polyurethane</i>
Ferrous Metals, Submerged or Intermittently Submerged – Non-Potable – Enclosed/Partially Enclosed Spaces, H ₂ S Resistant	SSPC-SP-5 Min Anchor Pattern 3.0 mils	Series 435 (15-20 DFT)		Series 435 (15-20 DFT)
		<i>Dura-Plate 5900</i>		<i>Dura-Plate 5900</i>
Ductile and Cast Iron Pipe, Interior and Exterior, Non-submerged	NAPF 500-03-04 / SSPC-SP-6	Series 66HS (3.0-5.0 DFT)	Series 66HS (3.0-5.0 DFT)	Series 73 (2.5-5.0 DFT)
		<i>Macropoxy 646</i> <i>FC Epoxy</i>	<i>Macropoxy 646</i> <i>FC Epoxy</i>	<i>Acrolon 218 HS</i> <i>Polyurethane</i>
Ferrous & Non-Ferrous Metals, Encased in concrete or requiring backpainting due to inaccessibility once installed	SSPC-SP-2			Series 1 (2.5-3.5 DFT)
		<i>Macropoxy 646</i> <i>FC Epoxy</i>		<i>Macropoxy 646</i> <i>FC Epoxy</i>
Non-Ferrous Metal (Other Than Galvanized), Interior and Exterior Non-Submerged	SSPC-SP-16 Surface Preparation of Galvanized Steel (Minimum 1 mil anchor profile)	Series 66HS (2.0-3.0 DFT)		Series 73 (2.5-3.0 DFT)
		<i>Macropoxy 646</i> <i>FC Epoxy</i>		<i>Acrolon 218 HS</i> <i>Polyurethane</i>
Galvanized Steel, Interior and Exterior	SSPC-SP-16 Surface Preparation of	Series 1 for field touch-up (2.5-3.5 DFT)	Series 66HS (2.0-3.0 DFT)	Series 73 (2.5-3.0 DFT)

Schedule 09900-B - Coating Systems				
Surface	System Surface Preparation	System Finishes		
		Primer	2nd	Final
	(Shop/Field)	DFT = Dry Film Thickness, Mils		
	Galvanized Steel 1.0-1.5 mil profile	<i>Corothane I Galvapak 1K for field touch up</i>	<i>Macropoxy 646 FC Epoxy</i>	<i>Acrolon 218 HS Polyurethane</i>
Submerged or Intermittently Submerged Concrete – Non-Potable, pH 5-10	SSPC-SP-13 (Reference ICRI CSP 5)	Series 218 (~ 125 mils DFT)	Series 435 (15.0-20.0 DFT)	Series 435 (15.0-20.0 DFT)
		<i>Dura-Plate 2300</i>		<i>Dura-Plate 5900 + Type SC aggregate</i>
Notes				
(1) Tnemec Products are listed in the first row for each surface and Sherwin-Williams products are listed in italics on the second row for each surface without a dry film thickness. Refer to Paragraph 2.1 for “or equal” products.				

Schedule 09900-C - Colors	
Item	Color
Sewerage	Grey
Manufacturer primed equipment and materials	To be selected by the Owner
Notes: (1) For piping not to be painted (see Paragraph 1.4 B), the color coding shall apply to the background color of the identification markers provided in Section 15075.	

END OF SECTION

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SECTION 11000
EQUIPMENT - GENERAL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. General requirements for the equipment and services to be provided under the Sections of Divisions 11, 13, 14 and 15, including, but not limited to, the following:
 - a. Structural design (including seismic, wind, snow, and buoyancy)
 - b. Electrical requirements for vendor supplied equipment and control panels
 - c. Handling, storing, and installing materials and equipment during the progress of the work
 - d. Coordination with equipment suppliers and subcontractors
 - e. Anchor bolts, assembly hardware, and foundations
 - f. Services of manufacturers' representatives for start-up, inspection, and testing
 - g. Operation and maintenance manuals
 - h. Operator training
 - i. Lubricants, spare parts, nameplates, special tools, and safety equipment
 - j. Surface preparation and shop prime painting of equipment
 - k. Off-site inspection
 - l. Equipment substitutions

B. Related Sections

1. Section 01770, Closeout Procedures
2. Section 03300, Cast-in-Place Concrete
3. Section 09900, Painting
4. Division 11 – Equipment
5. Division 13 – Special Construction
6. Division 15 – Mechanical
7. Division 16 – Electrical

1.2 SUBMITTALS

A. Structural Design for Seismic, Wind, Snow, and Buoyancy

1. If required by individual equipment specification sections, submit a Structural Design Certification with a complete set of supporting calculations and design details stamped by a Professional Engineer registered in the State where the work is being performed. The Structural Design Certification shall state that the equipment components and anchoring systems comply with the applicable building codes (to be listed in the letter) and will be able to restrain the equipment from all applicable forces (gravity, seismic, liquid sloshing, wind, snow, buoyancy, etc.) without damage to the equipment/materials and support

structures. The certification shall clearly reference the specific design details (to be stamped) for mounting and supporting the equipment designed by the Professional Engineer for the equipment.

2. In submitting the design certification and calculations, the Professional Engineer is representing that they are experienced in the analysis and design of the equipment being restrained and supported, equipment supports and equipment anchorages, and securing the equipment components and related supports to structures.
3. Perform analysis and design in accordance with the applicable building codes for the location where the work is being performed.
4. Calculate the seismic force (F_p) using equations and coefficients for the Seismic Hazard Exposure, Use Group, Building Risk Category, and Seismic Design Category for the site and building use. Include the effects of liquid movement for equipment containing free liquids subject to sloshing.
5. In addition, design for wind and snow loads if equipment is not located completely within a structure. Equipment located under a canopy must still be designed for wind and snow load.
6. In addition, design applicable systems for both submerged and non-submerged conditions. Applicable systems include, but are not limited to, equipment located below the design flood elevation, and equipment/piping installed under potentially submerged conditions. See design criteria below for the design flood elevation(s).
7. Base the analysis and design on actual equipment data (dimensions, weight, center of gravity) obtained from manufacturer's equipment submittals.
8. The structural design calculations shall be properly coordinated with the design details.
9. Coordinate all attachments with the structural engineer of record for the supporting structure to verify the attachment methods and the ability of the supporting structure to accept the loads imposed.
10. Design details shall include and clearly detail the following:
 - a. All attachment points between the equipment and the supporting structure(s).
 - b. Anchor type, size, embedment, minimum spacing, and minimum edges distances.
 - c. Details of hanger, support, and miscellaneous structures.
 - d. Other pertinent information required.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Provide dry, heated, and ventilated storage facilities for materials and equipment awaiting incorporation in the Work. Be responsible for the protection, loss of, or damage to materials and equipment furnished until final completion and acceptance of the work. Pay for all storage and demurrage charges from suppliers and transportation companies. Defective material and equipment shall be removed immediately from the site of the work, at no additional cost to the Owner.
- B. Coat all machined surfaces subject to corrosion with an easily removable rust preventive compound prior to shipment.

- C. Ship fabricated assemblies in the largest sections permitted by carrier regulations, properly labeled for field erection.
- D. Deliver equipment in manufacturer's original, unopened and undamaged packages, unless mounted on equipment assembly.
- E. Contractor shall store and maintain all equipment in strict accordance with the manufacturer's written short-term and long-term storage requirements.
- F. Store in a manner to protect items with epoxy shop coatings from exposure to UV light which can cause chalking of the epoxy. Length of acceptable exposure prior to providing UV protective measures shall be in accordance with coating manufacturer's recommendations. This includes protection from UV light after installation while awaiting covering or filling of tanks, or field finish painting for items scheduled to be top coated.
- G. Should damage occur, immediately make all repairs and replacements necessary to the satisfaction of the Engineer at no cost to the Owner.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Anchor bolts, nuts, washers, bolt sleeves, and assembly hardware shall be Type 316 stainless steel. Expansion bolts shall be "Thunderstuds", as manufactured by Unifast Industries, Inc., Hauppauge, NY; Redhead "Wedge Anchors" as manufactured by ITT Phillips, Michigan City, ID; Parabolt as manufactured by the Molly Division Emhart Corp., or equal. Epoxy encapsulated bolts shall be Hilti HIT-HY 200 Adhesive Anchors or equal. All expansion bolts and associated hardware are to be stainless steel.
- B. Grout shall meet the requirements of Section 03300.
- C. Programmable Logic Controllers shall meet the requirements of Section 11312, Submersible Wastewater Pumps.
- D. Manufacturer provided electrical work shall meet the requirements of Division 16 - Electrical.
- E. Field electrical work is included in Division 16.
- F. Surface preparation and shop prime painting shall meet the requirements of Section 09900.
- G. Nameplates - Provide with each piece of equipment a nameplate of non-corrodible metal, fastened in place and permanently inscribed with the manufacturer's name, model or type designation.
- H. Equipment Drive Guards - Provide approved all-metal guards to enclose the drive mechanism for equipment driven by open shafts, belts, chains, or gears. Guards are to be constructed of galvanized sheet steel or galvanized one inch mesh screen (woven wire or expanded metal) set in a frame of galvanized steel members. Secure guards in position by steel braces or straps, which will permit easy removal for servicing the equipment. Equipment guards shall conform with all applicable OSHA requirements.

PART 3 EXECUTION

3.1 PREPARATION

- A. Surface Preparation and Shop Prime Painting

1. Paint System: Upon receipt of approval by the Engineer, notify all equipment and material suppliers of the selected manufacturer of the paint for the project. Give written direction to each supplier with prime paint designations, colors, and mil thickness coverage requirements. Primer paint must be compatible with the specified and approved field-applied top coats. Surface preparation and shop priming shall be in accordance with the provisions of Section 09900 unless otherwise specified in Division 11 Sections. Ship chains, sprockets, gears and the like from the factory with a heavy coating of protective grease.
2. Field painting shall be in accordance with the provisions of Section 09900.
3. Certain equipment is specified to be field prepared and field primed. Refer to appropriate equipment sections for definition.

3.2 ERECTION, INSTALLATION, APPLICATION

A. Coordination

1. Coordinate mechanical, electrical and instrumentation requirements of the equipment covered by this section with each of the Suppliers and Subcontractors working on the project. This includes but is not limited to providing each with copies of preliminary and final submittals for each equipment item that may impact the work of another Supplier or Subcontractor. The Owner is not liable for any additional costs that originate from the Contractor's failure to properly coordinate this work. The Owner is not responsible for any extra costs related to removal or replacement of equipment, components, conduits or wire resulting from the failure to coordinate equipment requirements.

B. Anchor Bolts, Inserts and Assembly Hardware

1. Anchor bolts and expansion bolts are to be provided by the manufacturer and set accurately in the Work by the Contractor. Anchor bolts that are set before the concrete has been placed shall be carefully held in templates. Where specified in the Contract Documents, anchor bolts shall be provided with square plates at least 4 inches by 4 inches by 3/8 inches. Alternatively, provide anchor bolts that have square heads and washers and set in the concrete forms with pipe sleeves. If expansion bolts are set after the concrete has been placed, drill and grout or caulk. Do not damage the structure or finish by cracking, chipping, or spalling concrete during the drilling and setting. Engineer will approve the setting of expansion bolts after placement of concrete.
2. Concrete inserts shall be designed by the manufacturer to support safely, in the concrete that is used, the maximum load that can be imposed by the hangers used by the inserts. Provide galvanized inserts which permit adjustment of the hangers both horizontally (in one plane) and vertically and locking of the hanger head or nut.
3. Manufacturer shall provide assembly hardware in accordance with the complete parts list. Label all assembly hardware and package separately for delivery to the job site.

C. Foundations, Installation, and Grouting

1. Furnish the necessary materials and construct concrete foundations for all equipment installed. Foundation size and elevations may be determined in the field by the Engineer. The tops of foundations shall be at such elevations as will permit grouting as specified below.

2. Install all equipment in accordance with the manufacturer's instructions. .
3. In setting pumps, motors, and other items of equipment, make an allowance of at least 1 inch for grout under the equipment bases. Use steel shims to level and adjust the bases. If shims are left embedded in the grout, install neatly and so as to be as inconspicuous as possible in the completed Work. Unless otherwise required by the manufacturer, use a non-metallic non-shrink grout as specified in Section 03300.
4. Mix and place grout in accordance with the manufacturer's recommendations. Where practicable, place the grout through the grout holes in the base and work outward and under the edges of the base and across the rough top of the concrete foundation to a peripheral form. Construct form to provide a 1 inch chamfer around the top edge of the finished foundation. Where such procedure is impracticable, the method of placing grout shall be as permitted by the Engineer. After the grout has hardened sufficiently, all forms, hoppers, and excess grout shall be removed, and all exposed grout surfaces shall be patched in an approved manner, if necessary.
5. Rub foundations and exposed grout surfaces in accordance with 03300.
6. If threaded rod with lower support nuts are used to secure the equipment in place temporarily during concrete equipment pad placement, the support nuts shall be removed prior to grouting so that the threaded rod anchor bolts are not supporting the equipment and the top nuts can be tightened to secure the equipment directly to the large bedding surface provided by the non-shrink grout and concrete equipment pad. Equipment foundations shall be designed to absorb equipment vibration and transmit forces to building structure or ground.

3.3 SITE QUALITY CONTROL

A. Performance Tests - General

1. All equipment, components and systems furnished under this Contract, including those furnished by Subcontractors, must be demonstrated to achieve compliance with the Contract performance requirements.
2. Furnish all fuel and water required for the start-up, debugging, and performance testing of all systems furnished under this Contract.

B. Services of a manufacturer's representative

1. Arrange for a qualified service representative from each company manufacturing or supplying equipment to perform the work described in this section.
2. Inspect, operate, test, and adjust the equipment after installation has been completed and the equipment is presumably ready for operation, but before it is operated by others. At a minimum, include the following points in the inspection:
 - a. Soundness (without cracked or otherwise damaged parts).
 - b. Completeness in all details, as specified.
 - c. Correctness of setting, alignment, and relative arrangement of various parts.
 - d. Adequacy and correctness of packing, sealing and lubricants, etc.

3. Operate, test, and adjust equipment to prove that it is left in proper condition for satisfactory operation under the conditions specified.
 4. Upon completion of this work, submit, 3 copies to the Engineer of a complete, signed report of the results of this inspection, operation, adjustments, and tests. Include in report a detailed description of the points inspected, tests and adjustments made, quantitative results obtained, and suggestions for precautions to be taken to ensure proper maintenance. Certify in the report that the equipment (1) has been satisfactorily installed and conforms to the Contract Documents; (2) is in accurate alignment; (3) is free from any undue stress imposed by connecting piping, supports or anchor bolts; (4) has been operated under full load and operates satisfactorily; and (5) that nothing in the installation will render the manufacturer's warranty null and void.
 5. After the Engineer has reviewed the reports from the manufacturer's representatives, make arrangements to have the manufacturer's representatives present when the field acceptance tests are made.
- C. Off-Site Inspection - Fabrication, manufacture, painting or testing work may be inspected by the Engineer before shipment. Give notice to the Engineer of the place and time where such fabrication, manufacture, testing, or shipping is to be done. Such notice shall be in writing and delivered to the Engineer in ample time so that the necessary arrangements for the inspection can be made.

3.4 CLOSEOUT ACTIVITIES

A. Operator Training

1. Upon satisfactory completion of the start-up and calibration, provide the services of a manufacturer's trained representative to instruct Owner's personnel in the proper operation and maintenance of the equipment. This separate period of on-site training shall be provided independent of start-up and testing services.
2. The manufacturer's trained representative who will be providing the instruction shall have prior operation, maintenance and instructing experience acceptable to the Engineer.
3. When requested, submit the manufacturer's trained representative's name and qualifications to the Engineer for approval at least one week prior to the scheduled operating and maintenance instruction sessions.
4. Provide the Owner with a minimum 7 days written notice of planned operator training.
5. Coordinate the scheduling of on-site training to meet the following requirements:
 - a. No single training session shall be more than 6 hours duration or 4 hours if specified to occur on 2 or more separate days.
 - b. Training shall not be scheduled on two consecutive days.
 - c. No more than 3 training sessions shall be scheduled in any week.
 - d. Training sessions shall not be scheduled for Saturdays, Sundays or holidays.

3.5 PROTECTION

- A. Protection Against Electrolysis - Where dissimilar metals are used in conjunction with each other, provide insulation between adjoining surfaces to eliminate direct contact

and any resultant electrolysis. Use bituminous impregnated felt, heavy bituminous coating, non-metallic separators or washers, or other approved materials as insulation materials.

3.6 MAINTENANCE

- A. Lubricants - Prior to testing and acceptance, furnish a one year's supply of all lubricants recommended by the manufacturers of each component of the equipment provided.
- B. Spare Parts - Pack spare parts in containers or boxes bearing labels clearly designating the contents and the piece of equipment for which they are to be used.
- C. Special Tools - For each type of equipment furnished, provide a complete set of special tools (including grease guns or other lubricating devices) which may be necessary for the adjustment, operation, maintenance, and disassembly of such equipment. Tools shall be high-grade, smooth, forged, alloy, tool steel. Grease guns shall be lever type. Special tools are considered to be those which because of their limited use are not normally available, but which are necessary for the particular equipment.
- D. Submit operation and maintenance manuals for items listed in pertinent other sections of these Specifications and for other items when requested by the Engineer. Provide manuals a minimum of 30 days prior to equipment start-up. Manuals shall comply with the requirements of Section 01770.
- E. Submit Final Documentation, Equipment Startup Reports in accordance with Section 01770.

END OF SECTION

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SECTION 11312**PACKAGED SUBMERSIBLE WASTEWATER PUMPING EQUIPMENT****PART 1 GENERAL****1.1 SUMMARY****A. Section Includes**

1. All labor, equipment and materials necessary to furnish, install, test and place in operation submersible wastewater pumping units, controls and other ancillary equipment, designed for raw wastewater service, as shown on the Drawings and specified herein.
2. Submersible wastewater pumps (three installed), base elbow, and all internal wiring and other ancillary equipment, designed for raw wastewater service, as shown on the Drawings and specified herein.
3. Field wiring requirements are specified in Division 16 and shown on drawings.
4. Lift-out rail system
5. Pump control system including but not limited to adjustable frequency drives (AFDs), system control panel, instrumentation, and alarm systems shall be supplied by the City's Integrator in accordance with the quote included at the end of this section.
6. Contractor shall coordinate with the City's Integrator, Pump Manufacturer and Electrical Contractor to provide a complete system that meets all of the Specification requirements.

B. Related Sections

1. Division 1 – General Requirements
2. Section 03485 – Precast Concrete Structures
3. Section 09900 – Painting
4. Section 11000 - Equipment – General
5. Division 15 - Mechanical
6. Division 16 - Electrical

1.2 REFERENCES

- A. General - All electrical components shall conform to the requirements of the National Electric Code and must be listed and labeled "Approved" by Underwriters Laboratories (UL).
- B. ANSI/HI (American National Standards Institute/Hydraulic Institute) Pump Standards
- C. AFBMA (Anti-Friction Bearing Manufacturer Association)
- D. ANSI (American National Standards Institute)
 1. ANSI B16.1 – Cast Iron Flanges and Flanged Fittings

- E. ASTM (American Society of Testing and Materials)
 - 1. ASTM A48 - Standard Specification for Gray Iron Castings
- F. ISO (International Organization for Standardization)
- G. NEMA (National Electrical Manufacturers Association)

1.3 DEFINITIONS

- A. Pumping unit performance and construction shall conform to the ratings and nomenclature of the Hydraulic Institute Standards.

1.4 SYSTEM DESCRIPTION

- A. West Main Street Pump Station
 - 1. The equipment, which shall be complete in every detail as herein specified, includes, but is not necessarily limited to, three (3) submersible, wet pit wastewater pumps, each with base elbows, explosion-proof inverter duty motors and power and control cables.
 - 2. Provide piping, valves, and all specified electrical components and enclosures, and other related accessories as specified in their relevant specification sections.
 - 3. The pumping system shall include pump retrieval guides and supports.
 - 4. Pump control panel, AFDs (VFDs), and primary and secondary liquid level devices shall be as provided by the City's Integrator.
 - 5. The three pumping units which withdraw sewage from the pump station wet well. The discharge lines combine into a common header within the valve vault of the pump station, as shown on the drawings.
 - 6. Piping, valves, and connections shall be provided to allow by-pass of the station.
 - 7. A new precast concrete wet well and valve vault shall be provided for the pump station as shown on the drawings.

1.5 SUBMITTALS

- A. General- Comply with the pertinent provisions of the Division 1 Submittal Procedures.
- B. Product Data
 - 1. For each type of product specified, which shall include literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications. This information shall be prepared specifically for the pumps proposed. Catalog sheets showing a family of curves will not be acceptable.
- C. A marked-up version of this specification, which clearly indicates compliance with the provisions of this specification as well as any exceptions or deviations from the requirements of this specification. Contractor shall carefully review each paragraph, and mark it with either a check indicating the submittal is in compliance with the requirements, or an "X" if the requirement cannot be met. For any paragraph marked

with an "X", include a description of why the requirement is not applicable or a description of any deviations from the requirements.

D. Shop Drawings

1. Manufacturer's rating curves showing pump characteristics of discharge, head, capacity, brake horsepower, efficiency, required net positive suction head, required minimum submergence, and total pumping unit weight.
2. Indicate pump type, capacity and power requirements. Submit certified pump curves showing pump performance characteristics. Curves shall plot total dynamic head (ft) versus flow rate (gpm), horsepower versus flow rate (gpm), and efficiency versus flow rate (gpm). This information shall be prepared specifically for the pumps proposed. Catalog sheets are not acceptable.
3. Submit multiple pump curves covering speed ranges for the proposed variable speed pumps. Each curve shall plot total dynamic head (ft) versus flow rate (gpm), horsepower versus flow rate (gpm), and efficiency versus flow rate (gpm). This information shall be prepared specifically for the pumps proposed.
4. Details of fabrication, erection, and adjoining equipment interfaces for all equipment furnished under this Section.
5. Certified dimensional drawings of each item of equipment and auxiliary apparatus to be provided.
6. Certified foundation, pump support, and anchor bolt plans and details.
7. Listing of spare parts to be provided.
8. Manufacturer's electrical requirements for pumps including ladder-type wiring diagrams for interlock and control wiring, clearly indicating required field connections.
9. Bearing life calculations.
10. Contractor shall verify all dimensions within the proposed pump stations and provide a drawing of each location confirming that the selected pumps, including proposed valves, pipe, and fittings, fit within the proposed pump station space as depicted on the Drawings.

E. Quality Assurance/Control Submittals

1. A statement that each pump will function properly as installed with respect to the suction and layout as shown on the Drawings.
2. A "Letter of Compliance" stating that the characteristics of each pump (specifically naming the respective pumps), are such that they will not overload the specified motor horsepower under any head condition when operating at the specified maximum speed, and that the motor will not overheat at maximum turndown.
3. A certificate from the pump manufacturer stating that the installation of the pumping units is satisfactory, that the equipment is ready for operation, and that the operating personnel have been suitably instructed in the operation, lubrication and care of each unit. The report shall also confirm that nothing in the installation will render the manufacturer's warranty null and void.

F. Test and Evaluation Reports

1. Certified copies of all required test results shall be submitted to the Engineer for approval prior to shipment. Factory Test results shall be provided after approval of pump equipment submittals but before shipment of the pumps to the project location. Field test reports shall be provided after field testing.
2. Certified factory test data including performance curves for each of the proposed pumps from shut off to maximum capacity, showing total dynamic head, efficiency (wire-to-water), brake horsepower (BHP), required net positive suction head (NPSH), and minimum submergence. Data of tests and test points and results are required.
3. Certified motor test data as described in Division 16, and performance specifications for the motor.
4. Field test reports.

G. Closeout Submittals

1. Operation and Maintenance Manuals
 - a. Provide O&M Manuals and Equipment Start-up Reports per Sections 01770 and 11000.
 - b. Installation and operation instructions.
2. Warranty Documentation
3. Spare Parts
 - a. Furnish the pumps and drives, the manufacturer's standard set of spare parts including at least the following:
 - 1) One set of all gaskets (per each pump, total of 3 sets)
 - 2) One spare impeller
 - 3) One bottom plate or suction cover insert ring (whichever is applicable to the submitted pump)
 - 4) One hard iron insert/wear ring (if part is included in the selected manufacturer's equipment)
 - 5) One set of mechanical seals (per each pump, total of 3 sets)
 - 6) One set of bearings (per each pump, total of 3 sets)
 - 7) One O-ring kit (per each pump, total of 3 sets)
 - 8) Other spare parts as recommended by manufacturer
 - b. Spare parts shall be furnished packed in suitable containers and clearly labeled designating the contents and the unit for which they are intended.
 - c. Furnish all special tools required for the maintenance of the new pumps.

1.6 QUALITY ASSURANCE

A. General

1. The pump manufacturer shall also furnish and be responsible for the electric motors, in accordance with Division 16. The pumping equipment shall be adequately and safely designed and constructed for heavy duty use and continuous operation (where required) at the pressures and under all conditions of service to which they may be subjected.
2. To assure unity of responsibility, the pumps, motors, and bases shall be furnished and coordinated by the pump manufacturer to assure a matched and working system. The pump manufacturer shall assume responsibility for the satisfactory installation and operation of the entire pumping system including pumps, motors, and bases.
3. The pumps covered under this Section are intended to be pumping equipment of proven ability as manufactured by a reputable manufacturer having experience in the production of such pumps. The pumps furnished shall be designed, constructed, and installed in accordance with the best practice and methods, and shall operate satisfactorily when installed. Pumps shall be manufactured in accordance with the Hydraulic Institute Standards. Each type of pump shall be the product of one manufacturer.
4. These Specifications direct attention to certain features of the pumping units, but do not purport to cover all the details of their design. The equipment furnished shall be designed and constructed equal to high quality pumping equipment manufactured by such firms as are mentioned hereinafter for the various types of pumps or approved by the Engineer.

B. Qualifications

1. The pumps specified under this Section shall be furnished by a manufacturer who is fully experienced, reputable, and who has such pumps, or similar units, in successful operation for a minimum of five years.

1.7 DELIVERY, STORAGE AND HANDLING

- A. All parts shall be properly protected so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the units and equipment are ready for operation. On-site precautions must be taken by the Contractor to ensure adequate protection during storage.

1.8 WARRANTY

- A. Final acceptance of all equipment furnished under this Section will be withheld until after the installation and satisfactory field testing. The Contractor shall warranty the work against defects of any kind for a period of one year after final testing and acceptance, or Substantial Completion, whichever occurs later.
- B. In addition to the one-year Contractor warranty described above, the pump manufacturer shall provide a full 5-year, non-prorated warranty on all pumps supplied (pump, pump motors, etc.) Manufacturer's warranty shall be valid for 5 years from

the date of start-up or 5 year and 6 months from the date of shipment for each unit and shall cover 100% of the cost of repairs for parts and shop labor (shop labor to include all repair labor with the exception of labor to remove and transport pumps).

- C. Within the warranty period the manufacturer shall (at his own expense) promptly repair or replace any items as part of the delivered units which fail or simply wear producing a significant reduction in performance.

PART 2 PRODUCTS

2.1 GENERAL

- A. The pumping units required under this Section shall be complete including pumps, motors, and specified accessories. The pump manufacturer shall be responsible for the furnishing and performance of all equipment.
- B. Parts shall be so designed and proportioned as to have liberal strength, stability, and stiffness and to be especially constructed for the work to be done. Ample room and facilities shall be provided for inspection, repairs, and adjustment.
- C. All necessary foundation bolts, plates, nuts, and washers shall be furnished. Anchor bolts shall be Type 316 Stainless Steel, sized by the equipment manufacturer. Anchor bolts shall be supplied by the Contractor.
- D. Stainless steel nameplates giving the name of the manufacturer, the rated capacity, head, speed, serial number, and all other pertinent data shall be attached to each pump and motor. A special data plate shall be attached to the pump frame, which shall contain identification of frame and bearing numbers.
- E. Comply with the requirements of Section 11000 (Equipment – General).
- F. Provide lifting lugs for equipment weighing over 100 pounds.
- G. Electrical devices and equipment to be UL rated.

2.2 MANUFACTURERS AND PUMP MODELS

- A. Xylem (Flygt): Model FM - NP 3202.095 HT-462_45hp, 1770 RPM;
- B. Sulzer (ABS): Model XFP 155J-CB2 PE 350/6_46.9 hp, 1200 RPM;
- C. Or equal.

2.3 PERFORMANCE DATA

- A. Refer to Table 1 at the end of this specification section.

2.4 SUBMERSIBLE-TYPE WASTEWATER PUMPS

- A. Pump Assembly

1. Construction

- a. Pumps shall be designed for handling raw wastewater. Major pump components shall be of ASTM A48, Class 35B or Class 40, with smooth surfaces devoid of blow holes or other irregularities. The casing shall have an integrally cast centerline discharge flange connection faced and drilled in accordance with 125-lb ANSI B16.1 Standard.

- b. The lifting handle shall be constructed of stainless steel. All exposed nuts or bolts shall be Type 316 stainless steel. All metal surfaces coming into contact with the pumped fluid, other than stainless steel or brass, shall be protected by a factory applied spray coating of acrylic dispersion zinc phosphate primer with a polyester resin paint finish on the exterior of the pump.
- c. Sealing design for the pump/motor assembly shall incorporate metal to metal contact between machined surfaces. Critical mating surfaces where a watertight seal is required shall be machined and fitted with Nitrile or Viton rubber O-rings. Fittings will be the result of controlled compression of rubber O-rings in two planes and O-ring contact of four sides without the requirement of a specific torque limit.
- d. Rectangular cross sectioned gaskets requiring specific torque limits to achieve compression are not acceptable. No secondary sealing compounds shall be used.

2. Impellers

- a. Impellers shall be ASTM A-532 (Alloy III A) 25% chrome cast iron or ASTM A-48, Class 40 gray cast iron, dynamically balanced, semi-open, single vane or multi-vane, non-clog design capable of passing the minimum spherical solids size specified.

- b. Xylem/Flygt N-Series

The impeller leading edges shall be mechanically self-cleaned upon each rotation as they pass across a spiral groove located on the volute suction. The screw-shaped leading edges of the gray iron impeller shall be hardened to Rc 45 and shall be capable of handling solids, fibrous materials, heavy sludge and other matter normally found in raw unscreened wastewater. The screw shape of the impeller inlet shall provide an inducing effect for the handling of up to 5% sludge and rag-laden wastewater. The impeller to volute clearance shall be readily adjustable by means of single trim screw. The impeller shall be locked to the shaft and held in place by a stainless steel bolt, which cannot be loosened by torque from either forward or reverse direction.

- c. Sulzer/ABS Contrablock

The impeller shall be semi-open, non-clog design, ASTM Class 35B cast iron. The impeller shall have a slip fit onto the motor shaft and drive key and shall be securely fastened to the shaft by a stainless steel bolt which is mechanically prevented from loosening by a positively engaged ratcheting washer assembly. The head of the impeller bolt shall be effectively recessed within the impeller bore or supporting washer to prevent disruption of the flow stream and loss of the hydraulic efficiency. The impeller shall be dynamically balanced to the ISO 10816 standard to provide smooth vibration free operation.

- d. The design of the pump and impeller arrangement shall promote self-cleaning, minimize clogging, be capable of handling solids, fibrous

stringy material, heavy sludge, and other matter normally found in wastewater, and still promote efficiency.

- e. The impeller shall be locked to the shaft and held in place by a stainless steel bolt, which cannot be loosened by torque from either forward or reverse rotation.

3. Volute

- a. The pump volute shall be a single piece of gray cast iron, ASTM A-48, Class 35B or ASTM A-48, Class 40, non-concentric design with centerline discharge and smooth passages of sufficient size to pass any solid that may enter the impeller. Minimum inlet and discharge size shall be as specified above.

- b. Xylem/Flygt

The volute shall have a replaceable suction cover insert ring in which are cast spiral shaped, sharp-edged grooves. The spiral grooves shall provide trash release pathways and sharp edges across which each impeller vane leading edge shall cross during rotation so to remain unobstructed. The insert ring shall be of the same material as the impeller and provide effective sealing between the multi-vane semi-open impeller and the volute housing.

- c. Sulzer/ABS

The volute shall include an externally adjustable bottom plate. The bottom plate shall be designed with an inlet incorporating strategically placed cutting grooves and outward spiral grooves on the side facing the impeller, to shred and force stringy solids outward from the impeller and through the pump discharge. The bottom plate shall be mounted to the volute with four stainless steel securing screws and four stainless steel adjusting screws to permit close tolerance adjustment between the bottom plate and impeller for maximum pump efficient. Adjustment to allow for wear and restore peak pumping performance shall be easily accomplished using standard tools, and without requiring disassembly of the pump. The bottom plate shall be of the same material as the impeller and provide effective sealing between the multi-vane semi-open impeller and the volute housing.

4. Pump Shaft

- a. The pump and motor shaft shall be a rigid integral unit, made from ASTM A479 S43100-T stainless steel or 420 stainless steel, of sufficient size to transmit the full driver horsepower with a liberal safety factor, accurately machined over its entire length and free from any harmful or damaging vibrations. Couplings shall not be acceptable. Shaft shall be adequately designed to meet the maximum torque required at any normal start-up condition or operating point in the system. Shaft shall be polished as necessary and have accurately machined shoulders to accommodate bearings, seals, and impeller. Carbon steel or chrome plated shafts shall not be considered adequate or equal.

5. Bearings

- a. Each pump shall be provided with bearings for both radial and axial thrust. Bearings shall be anti-friction type and of ample size to carry all loads imposed under continuous operation, minimizing shaft deflection and excessive heat buildup. Bearings shall be permanently lubricated. Bearings shall be designed in accordance with the ABMA standards for a minimum L_{10} bearing life of 50,000 hours between 50% of BEP flow and 150% of BEP flow.

6. Seal Assembly

- a. Each pump shall be provided with a tandem mechanical shaft seal system consisting of two totally independent seal assemblies. The seals shall operate in a lubricant reservoir that hydro-dynamically lubricates the lapped seal faces at a constant rate. The lower, primary seal unit, located between the pump and lubricant chamber, shall contain one stationary and one positively driven rotating corrosion resistant tungsten or silicon carbide ring. The upper secondary seal, located between the lubricant chamber and the motor housing, shall contain one stationary and one positively driven rotating, corrosion resistant tungsten or silicon carbide ring.
- b. Each seal interface shall be held in place by its own spring system. The seals shall not depend upon direction of rotation for sealing. Seals shall not require maintenance or adjustment.

7. Lubricant Chamber

- a. Each pump shall be provided with a lubricant chamber for the shaft sealing system. The lubricant chamber shall be designed to prevent overfilling and to provide lubricant expansion capacity. The drain and inspection plug, with positive anti-leak seal shall be easily accessible from the outside. The seal system shall not rely on the pumped media for lubrication.
- b. A moisture sensor probe shall be installed to detect the presence of water in the stator chamber. A corresponding relay designed to be mounted in any control panel shall be used in conjunction with the seal probe to detect moisture and energize a warning annunciation device in the control panel and/or cause the pump to shut down.

B. Motor

1. The pump motor shall be an induction type squirrel cage design. The rotor and stator shall operate in an air-filled and watertight NEMA B type housing. The stator windings and leads shall have a Class H insulation rating (365°F). The motor shall be designed for continuous duty while pumping fluids up to 104°F. Motors shall be capable of handling 15 equally spaced starts per hour.
2. The motor shall be rated for inverter duty as defined by NEMA MG1 Part 31.

3. The stator shall be heat-shrink fitted into the cast iron stator housing. The use of bolts, pins, or other fastening devices requiring penetration of the stator housing shall not be acceptable.
4. Thermal switches shall be embedded in each phase of the windings and set to open at 260°F. The thermal switches shall be used in conjunction with and supplemental to external motor overload protection, and shall be connected to the motor controls to shut down the pump during a high temperature condition.
5. The combined service factor as defined by NEMA MG1 shall be a minimum of 1.15. The motor shall have a voltage tolerance of plus or minus 10%.
6. The motor horsepower shall be selected such that the unit is non-overloading over the entire range of the pump performance. The motors shall have capacity sufficient to operate the pumps throughout the operating range without exceeding the nameplate rating for current and power, unless otherwise is specifically indicated.
7. Motor shall be provided with lifting lugs.
8. The motor and pump shall be produced by the same manufacturer.
9. The submersible motor shall be listed by Factory Mutual or UL as explosion-proof for service in Class I, Division 1, Group C and D hazardous locations.

C. Pump Support

1. Wet Pit Pumps

- a. The pumps shall be supplied with a mating cast iron discharge connection. The pumps shall be automatically and firmly connected to the discharge connection, guided by no less than two stainless steel guide bars extending from the top of the station to the discharge connection. Intermediate brackets shall be used for wet wells deeper than 20 feet. Lower, intermediate, and upper brackets shall be stainless steel. There shall be no need for personnel to enter the wet pit. The entire weight of the pump/motor shall be borne by the pump discharge elbow. No portion of the pump/motor unit shall directly bear on the well floor.
- b. Sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal to metal watertight contact, or by a field replaceable Nitrile rubber profile gasket or O-ring. The pump shall be automatically connected to the discharge piping when lowered into position.

D. Cooling System

1. Wet Pit Pumps

- a. The pump motors shall be sufficiently cooled by the surrounding pumped media without the need for a cooling jacket.

E. Motor Power Cables

1. Motor power cables shall be properly selected and sized for the electrical characteristics and loads and be of sufficient length to suit the installation

without requiring splices. The pump power/control cable shall be FM or UL approved for use in hazardous locations and comply with the National Electric Code and State Specific Codes. The exterior jacket shall be capable of continuous submergence in sewage.

2. The motor and cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet or greater.
3. The cable entry design shall not require specific torque requirements to ensure a watertight seal.
4. The cable entry seal shall be comprised of a single elastomer grommet with washers located on either side. A compression fit of the grommet seals the cable and entry from the exterior fluid. The cable entry assembly shall allow easy replacement of cable by using the same cable entry grommet.
5. The cable entry junction chamber shall be separated from the motor by a waterproof sealed terminal board.

F. External Hardware and Pump Surface Coating

1. All exposed nuts or bolts shall be Type 316 stainless steel.
2. All metal surfaces coming into contact with the pumped fluid, other than stainless steel or brass, shall be protected by a factory applied spray coating of acrylic dispersion zinc phosphate primer, or in accordance with the pump manufacturer's recommendations, with a polyester resin or high solids two part epoxy paint finish on the exterior of the pump.
3. The coating shall be resistant to sewage and other chemicals normally found in wastewater.

G. Pump Accessories Surface Preparation

1. Surface preparation and prime and finish painting of pump accessories are provided under this Section. Surface preparation shall be SSPC-SP6, commercial blast. Shop prime and finish painting shall be the manufacturer's standard polyester resin or high solids two part epoxy paint finish for wastewater applications.
2. Should painting system fail or bubbling occur within the pump warranty period, the pumps shall be prepped and repainted at the manufacturer's expense.
3. A minimum of one quart of touch-up paint shall be provided with the equipment.

H. Protection

1. Each pump motor shall incorporate three thermal switches, one per stator phase winding and be connected in series, to monitor the temperature of the motor. Should the thermal switches open, the motor shall stop and activate an alarm. A float switch shall be installed in the seal leakage chamber and will activate if leakage into the chamber reaches 50% chamber capacity, signaling the need to schedule an inspection. A resistance type probe located in the seal chamber shall also be acceptable.

2. The thermal switches and moisture detection device shall be connected to a combination relay for monitoring both motor overtemp and seal failure alarms. A combination relay for each pump shall be installed in the pump control pane.

I. Pump Accessories

1. Discharge pressure gauges shall be provided on discharge piping for each pump and shall meet the requirements of Section 15125.
2. All gauges shall be supplied with shut off and bleed cocks and diaphragms as required in Section 15125.

2.5 PUMP CONTROL PANEL

- A. A pump control panel shall be fabricated/furnished by the City's Integrator with controls as specified in the quote attached at the end of this section.

2.6 LIFT-OUT SYSTEM - WET PIT SUBMERSIBLE PUMPS

- A. A slide away coupling shall be provided for each wet pit submersible pump to allow the pump to be installed or removed without requiring personnel to enter the wet well. The coupling shall consist of a discharge elbow securely fastened to the floor of the chamber, a moveable bracket that bolts to the pump discharge flange and mates with the discharge elbow, and a system of guide pipes to guide the pump and moveable bracket from the discharge elbow to the access cover in the top of the chamber. Guide pipes shall be securely affixed to top of concrete structure hatch frame.
- B. The lift-out system shall consist of the following components:
1. Guide rails
 2. Intermediate guide rail brackets
 3. Lifting chain/cable with grab link
 4. Upper guide rail bracket
 5. Slide bracket
 6. Rail support/pump discharge elbows
 7. Anchor bolts
- C. Each guide rail system shall be constructed of schedule 40 type 316 stainless steel rails. Intermediate guide rail brackets shall also be type 316 stainless steel and shall be sized and installed with spacing per the manufacturer's requirements.
- D. All rails, brackets, anchor bolts, lifting chain/cable and miscellaneous fasteners for the guide rail system shall be type 316 stainless steel. Lifting chain/cable working loads shall be 100% greater than the weight of each pumping and motor assembly.
- E. All anchor bolts shall be 316 stainless steel and shall be of ample size and strength for the purpose intended. All anchor bolts shall be installed in accordance with the manufacturer's instructions.

PART 3 EXECUTION

3.1 GENERAL

- A. All adjustments necessary to place the equipment in satisfactory working order shall be made at the time of the field testing.

3.2 INSTALLATION

- A. Installation of pumps, pipes, valves and appurtenances shall be strictly in accordance with the recommendations and instructions of the manufacturer and located as shown on the Drawings or as approved by the Engineer. Supervision of installation and testing of equipment by the manufacturer's representative shall be provided in accordance with the requirements of this Section.
- B. It shall be the responsibility of the Contractor to coordinate the Work included under this Section with other related Work to ensure that all the equipment shall operate to perform the designated functions in a proper and acceptable manner.
- C. Pipe and fittings shall be installed in accordance with the Drawings and Specifications regarding excavation and backfilling, alignment and grade, trench preparation, pipe laying, blocking, anchoring, testing, protection and cleaning.
- D. Connect discharge piping without imposing strain to pump flanges.
- E. Anchor bolts shall be accurately placed using equipment templates.

3.3 TESTING

A. General

- 1. Provide a certificate from the equipment manufacturer stating that the installation of his equipment is satisfactory, that the equipment is ready for operation, and that the operating personnel have been suitably instructed in the operation, lubrication and care of each unit shall be submitted. The report shall also confirm that nothing in the installation will render the manufacturer's warranty null and void.

B. Factory Testing

- 1. Submit certified factory test data showing the results of factory testing for each of the proposed pumps including performance curves for each pump from shutoff to maximum capacity, showing total dynamic head, hydraulic and overall efficiency, brake horsepower, required NPSH, and minimum submergence.
- 2. Pumps shall be factory tested at a minimum of six head/capacity points including shutoff head and maximum capacity as required by ANSI/HI Pump Standards to ensure pumps are tracking along the certified pump curve. At least one point of the six shall be taken as near as possible to each specified condition. The results of all tests, including plots of the certified pump performance curves (specifically showing the test points) depicting head, capacity, brake horsepower and pump efficiency shall be submitted to the Engineer for approval. Acceptance of the pump test results will be judged at rated capacity and rpm with applicable total head and efficiency as +5%, -0%. Minimum efficiency shall be as specified.
- 3. Pumps shall be hydrostatically tested at 1.5 times the shut-off head internal pressure.

4. Motor and cable insulation shall be tested for moisture content and defects before and after the hydrostatic tests.
5. Submit a certified written report prepared by the manufacturer with the details and results of the tests.

C. Field Testing

1. Field test shall not be conducted until such time that installation is complete and ready for testing.
2. After the complete pumping units and appurtenant equipment have been installed, and the units have been inspected, tested, adjusted and placed in proper operating condition under the direct observation of the pump manufacturer's representative, the pumping equipment shall be field-tested by the Contractor in the presence of the Engineer.
3. The tests shall demonstrate fitness for the service specified and the ability of the pumping units to operate without vibration or overheating when operated to meet the performance requirements specified.
4. Pumps shall be field tested at a minimum of five head/capacity points including shutoff head and maximum capacity as required by ANSI/HI Pump Standards to ensure pumps are tracking along the certified pump curve. The results of all tests, including plots of the certified pump performance curves (specifically showing the test points) depicting head, capacity, brake horsepower and pump efficiency shall be submitted to the Engineer for approval.
5. Acceptance of the pump test results will be judged at rated capacity and rpm with applicable total head and efficiency per current ANSI/HI 11.6 – Rotodynamic Submersible Pumps standard tolerances for the pumps specified grade. (HI < 10kW) Minimum efficiency shall be as specified.
6. Each of the pumps shall be run for a minimum of two weeks under normal operating conditions or for 24 hours of total runtime at maximum capacity, without malfunction, whichever comes first, prior to acceptance.
7. Record driving motor voltage and amperage measured for each phase.
8. Adjust, realign, or modify units and retest, if necessary.
9. Correct or replace promptly all defects or defective equipment revealed by or noted during testing, and if necessary, repeat the tests until satisfactory results are obtained. Furnish all labor, piping, equipment and materials necessary for testing.
10. In the event the equipment fails to meet any of the requirements specified above, the necessary changes shall be made, and the equipment retested. If the equipment remains unable to meet the specified requirements to the satisfaction of the Owner, remove and replace the equipment with satisfactory equipment at no cost to the Owner.

D. Manufacturer's Field Services

1. Coordinate the services of a qualified field service engineer provided by the manufacturer for start-up, inspection, and testing.
2. Provide the services of a manufacturer's factory-trained technician to train the Owner on the operation, calibration and maintenance of equipment supplied under this Section. Provide the Owner with a minimum 7 days' written notice of planned operator training.

A minimum of 8 hours (per pump provided) of field service shall be provided by an authorized, factory trained representative of the pump manufacturer for installation and start-up supervision for the pumps and pump controls. Services shall include, but not necessarily be limited to, inspection of the completed installation to ensure that it has been performed in accordance with the manufacturer's instructions and recommendations, and supervision of all field testing, and training in the operation and maintenance of all equipment provided under this Section, as well as activation of the Warranty.

TABLE 1 - Performance Data		
Pump Reference		West Main Street Pump Station
Service		Medium Capacity Wastewater (Raw), Continuous/Intermittent Operation
Maximum Liquid temperature		104°F
Pump Type		Wet-Pit Submersible Non-Clog Centrifugal
Number of Pumps to be Provided		3
Minimum Pump Suction Diameter		6"
Minimum Pump Discharge Diameter		6"
Minimum Spherical Solid Size		3"
Maximum Rated Speed		1770 rpm
Maximum Motor Size (Non-Overloaded Across Entire Pump Curve)		46.9 hp, 57 FLA
Motor Type		Explosion Proof, Compatible with Variable Frequency Drives
Power Requirements		480 V/3 Ph/60 Hz
Minimum Pump Shutoff Head		109'
Maximum Pump Weight (Combined Pump & Motor)		1,450 lbs.
Single Pump at Full Speed Design Condition	Design Point	900 gpm @ 59.6 ft TDH
	Maximum NPSH_R	20' @ 1400 gpm
	Minimum Hydraulic Efficiency	71.8%
	Minimum Wire-to-Water Efficiency	69%
Peak Design Condition	Peak Flow Design Point	2,100 gpm @ 90.2 ft TDH
	Number of Pumps Operating at Full-Speed	2
1. Only pumps with full size casing connection sizes specified will be considered. 2. Under normal operating conditions, the maximum suction static water level will be approximately 8.36-feet above the centerline and the minimum suction static water level will be 1.0-feet above the centerline of the pump discharge. 3. The specified pump shall be non-overloaded for the system curve, based on the points above.		

END OF SECTION

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5 Dwight Park Drive
Syracuse, NY 13209
Phone: (315) 413-0400
Fax: (315) 413-0404

Proposal # Q1-21-045-A
June 3, 2022

City of Beacon City Hall
1 Municipal Plaza
Beacon, NY 12508

Attention: Mr. Ed Balicki

Reference: City of Beacon – West Main Street Pump Station Pump Control Panel (PCP) and Accessories

AquaLogics Systems, Inc. is pleased to offer the following proposal for your consideration.

Pump Control Panel:

Qty.1- Variable Speed Triplex Pump Control Panel (PCP) inclusive of the following:

- 72" H x 72" W x 16" D, NEMA 12 fan ventilated floor mount enclosure
- Input Power: 460VAC, 3-phase, 60 Hz.
- CITEL 460VAC surge protector
- Main Circuit Breaker (MCB) with door interlocked disconnect switch, 225A
- (3) Socomec VFD Fused disconnect switches, 100A
- (3) ABB ACS580, 460VAC, 50 HP VFDs
- 750VA, 460/120VAC control and ancillary power control transformer
- Allen-Bradley branch circuit rated 120VAC control power circuit breakers as required
- Cyberpower 1000VA Uninterruptible Power Supply (UPS), 120VAC
- PULS 240-watt, 24VDC power supply with input and output fuses as required
- Allen-Bradley MicroLogix 1400 Programmable Logic Controller (PLC) with 1762 series I/O modules
- Panel mounted Allen-Bradley PanelView Plus 7, 10" color touch screen Operator Interface Unit (OIU)
- N-TRON 105TX unmanaged Ethernet switch
- (3) ABB panel mounted ACS580 VFD remote mount keypads
- (3) Panel mounted pump control stations consisting of Hand-Off-Auto (H-O-A) mode of operation selector switch, call, run and fail pump status pilot lights and nameplate
- (3) Panel mounted ENM pump runtime meters
- Allen-Bradley panel mounted Level/Auto/Float mode selector switch pilot light, 30-mm, push-to-test
- Allen-Bradley panel mounted Float mode enabled pilot light, 30-mm, push-to-test
- Allen-Bradley panel mounted Float mode disable pushbutton
- Allen-Bradley panel mounted common alarm pilot light, 30-mm, push-to-test
- Floyd Bell panel mounted alarm horn
- Allen-Bradley panel mounted, alarm silence/reset pushbutton
- (3) Pump seal/temperature monitoring relays
- PEPPERL+ FUCHS level transmitter and float switch intrinsically safe barriers
- Wetwell level transmitter surge protector
- All required relays, wire, terminal blocks and misc. control panel hardware
- Completely factory wired and tested for proper functionality
- UL698A Listed and Labeled

Instrumentation:

- Qty.1- Remote Alarm Dialer; RACO VSS-4C four (4) channel alarm dialer in NEMA 1 wall mount enclosure.
- Qty.1- Wetwell Level Transmitter; TE Connectivity/KPSI model 750 submersible level transmitter with 10.0' PSI range, 50'vented cable and lifetime surge protection warranty.
- Qty.1- AquaLogics model SSSW-36-0.50-40 stainless steel wetwell level transmitter weighted suspension kit.
- Qty.1- High Level Float Switch; SJE Rhombus normally-closed, non-mercury float switch with 50' cable.
- Qty.5- Low Level and Pump Control Float Switches; SJE Rhombus normally-open, non-mercury float switch with 50' cable.
- Qty.1- Float switch anchor assembly for mounting float switches, PVC coated anchor with 40' SS chain and six (6) float clamps.

Services:

- Qty.1- Day onsite service to provide equipment start-up, final calibration and system programming as required.
- Qty.1- Day onsite service to provide operator training as required.

Documentation:

- Qty.3- Sets Operations & Maintenance documentation.

Pricing:

Pump Control Panel.....	\$53,275.00
Instrumentation.....	\$4,965.00
Service.....	\$3,106.00
Total Net Price.....	\$61,346.00

Taxes:

Sales or Use Taxes are not included

Warranty:

All proposed equipment is warranted against system failure due to defects in workmanship and/or materials for a period of twelve (12) months from equipment start-up, not to exceed eighteen (18) months from date of shipment from our factory. This warranty does not cover failures due to human negligence and/or acts of nature.

Not Included:

Equipment installation, field wiring, conduits or piping unless specifically stated above.

Freight:

Prepaid and included.

Delivery:

16-20 weeks after receipt of order.

Terms:

95% Net 30 days, 5% retainage allowed, not to exceed 90 days from shipment.

Thank you for the opportunity to provide you with our quotation, should you have any questions or desire additional information please don't hesitate to contact our office.

Best regards,
AquaLogics Systems, Inc.

A handwritten signature in cursive script that reads "Donald W. Ballway".

Donald W. Ballway

SECTION 13121

PRECAST CONCRETE BUILDING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Provide all labor, materials, equipment and services necessary to furnish, install, and place in operable condition, a factory-built building together with all ancillary equipment. The building shall be a prefabricated, reinforced, modular, concrete building. The building shall have minimum interior dimensions of 10'-9" wide x 19'-7" long x 9'-0" high. If the Contractor utilizes equipment other than what is designated as the basis of design on the drawings then building size may need to increase to provide similar clearances around equipment. The building, shall be off-loaded, installed and connected by the contractor at the site with minimal connections required. The precast manufacturer shall provide a building with the following items completed:
 - a. Precast single-level concrete building enclosure
 - b. Electric heating, lighting, and power
 - c. Doors
 - d. Pipe penetrations
 - e. Electrical equipment including wiring, pipe and electrical conduit for lighting, circuit breakers, panelboards, wall penetration sleeves and mechanical seals, junction, pull, and terminal boxes.
 - f. Building insulation and finish materials
 - g. Pump Station equipment/control panels, utility connections and foundation systems shall be completed in the field.

A. Related Sections

1. Section 02315 - Excavation, Backfilling, and Compaction
2. Section 03200 - Concrete Reinforcement
3. Section 03300 - Cast-in-Place Concrete
4. Section 07210 - Building Insulation
5. Section 07530 - EPDM Sheet Roofing
6. Section 07620 - Sheet Metal Flashing And Trim
7. Section 08110 - Steel Doors and Frames
8. Section 08710 - Door Hardware
9. Section 09900 - Painting

10. Division 16 - Electrical

1.2 REFERENCES

- A. State of New York Building Code, most recent edition.
- B. State of New York Electrical Code
- C. American Concrete Institute (ACI)
 - 1. ACI 301 - Specifications for Structural Concrete for Buildings, (included as part of this specification).
- D. Concrete Reinforcing Steel Institute
 - 1. "Manual of Standard Practice"
- E. American National Standards Institute (ANSI)
 - 1. "Building Code Requirement for Minimum Design Loads in Buildings and Other Structures"
- F. American Society for Testing and Materials (ASTM)
 - 1. ASTM A185 - Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
 - 2. ASTM A615 - Specification for Deformed and Plain Billet - Steel Bars for Concrete Reinforcement.
 - 3. ASTM C33 - Standard Specification for Concrete Aggregates.
 - 4. ASTM C39 - Standard Method of Testing for Compressive Strength of Cylindrical Concrete Specimens.
 - 5. ASTM C150 - Standard Specification for Portland Cement.
 - 6. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
 - 7. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.
- G. NFPA - National Electrical Code
- H. Prestressed Concrete Institute (PCI)
 - 1. MNL-116 - Manual for Quality Control for Plants and Production of Precast Prestressed Concrete Products.

1.3 SUBMITTALS

- A. Product Data
 - 1. Submit manufacturer's product data, installation and start-up instructions, use limitations and recommendations for each material used. Provide certifications stating that the materials comply with the requirements.
- B. Building

1. Shop drawings, prepared and sealed by professional Engineer registered in The State of New York, shall be submitted in accordance with the requirements of the project showing dimensions, sizes, thickness, materials, finishes and methods of assembly. Submit Manufacturer's technical data for all building hardware and equipment. All work shall be fabricated and erected in accordance with the Manufacturer's drawings.
2. Structural design calculations for the building shall be prepared and sealed by a registered professional Engineer in New York State and shall be submitted for approval prior to fabrication.
 - a. Structural Design
 - b. Provide a certificate of Compliance stating that the building supplied meets either the prescriptive or the performance requirements of the 2018 International Energy Conservation Code or the current prevailing version of this Code.

C. Shop Drawings

1. The drawings show a generalized configuration for the Electrical building. Submittals shall include separate scaled, detailed drawings for the precast concrete structure. Prepare drawings showing the proposed arrangement of work.
2. Indicate dimensions, required clearances, openings, and method of assembly of components.

D. Operational and Maintenance Manual

1. Submit Operating and Maintenance Manual and parts lists for controls, and accessories, including "trouble shooting" maintenance guide. Include this product data, shop drawings, and wiring diagrams in maintenance manual.

1.4 SYSTEM DESCRIPTION

- A. The factory-built building precast concrete building together with all ancillary equipment as described herein shall be factory installed. The building shall be internally pre-wired and tested in accordance with the provisions of the National Electrical Code. Panel shall have the UL listing mark for industrial control panels.
- B. Provide watertight precast concrete structures in types and sizes indicated on the drawings, with cast-in wall sleeves for pipe as indicated on the drawings. The building shall be complete with all equipment specified herein.
- C. Minimum strength of concrete shall be 5,000 psi at 28 days. Reinforcing steel shall conform to ASTM A615 Grade 60. Joints between structures sections shall be sealed with preformed flexible, vulcanized rubber butyl rubber sealant.

1.5 QUALITY ASSURANCE

- A. The Precast Concrete Building Manufacturer shall have a minimum of 5 years experience in building fabrication. In addition, the Manufacturer shall have made no less than 10 buildings similar to the one on this project. Evidence must be submitted to verify that these requirements are met prior to being deemed an acceptable manufacturer.

1. Fabricator must be producer member of the Prestressed Concrete Institute (PCI) and participate in its Plant Certification Program.
2. The Building Manufacturer must maintain "Certification in Good Standing" for product groups B & C, under the PCI plant certification program.

B. Source Quality Control

1. One set of 4 compression test cylinders shall be made for each day's production for each type of precast Unit. Make compression test specimens in accordance with ASTM C31. Obtain concrete for specimens from actual production batch. Cure specimens using same methods used for curing precast units.
2. Two specimens shall be tested at 28 days for acceptance, one shall be tested prior to removing forms, and one shall be tested at seven days. Compression tests shall be conducted in accordance with ASTM C39. Do not remove precast units from forms unless strength tests have been completed and results are equal to, or greater than, minimum required values.

C. The Engineer shall have the right to inspect or test any materials during fabrication in the factory. At the option of the Engineer, certified tests of materials may be accepted in lieu of field tests. Provide 7-day written notification to the Owner's Project Representative prior to casting the structures. The Engineer may sample the concrete and inspect reinforcement placement at the time of fabrication.

D. The quality of all materials, the process of manufacture, and the finished sections shall be subject to inspection and approval by the Engineer. Such inspection may be made at the place of manufacture, or on the work after delivery, or at both places, and the materials shall be subject to rejection at any time on account of failure to meet any of the Specifications requirements, even though samples may have been accepted as satisfactory at the place of manufacture. Material rejected after delivery to the job shall be marked for identification and shall be removed from the job at once. All materials, which have been damaged after delivery will be rejected, and if already installed, shall be acceptably repaired, if permitted, or removed and replaced, entirely at the Contractor's expense.

E. At the time of inspection, the materials will be carefully examined for compliance with these Specifications, and with the approved manufacturer's drawings. All sections shall be inspected for general appearance, dimension, "scratch-strength," blisters, cracks, roughness, soundness, etc. The surface shall be dense and close-textured.

F. Imperfections in sections may be repaired, subject to the approval of the Owner's Project Representative, after demonstration by the manufacturer that strong and permanent repairs result. Repairs shall be carefully inspected before final approval. Cement mortar used for repairs shall have a minimum compressive strength of 4,000 psi. at 7 days and 5,000 psi. at 28 days, when tested in 3 inch by 6 inch cylinders stored in the standard manner. Epoxy mortar may be utilized for repairs subject to the approval of the Engineer.

G. All electrical wiring and equipment shall be installed in conformance to the National Electrical Code.

- H. The Contractor shall be responsible for obtaining and paying for all applicable permits and inspections for the building and electrical installations, including but not necessarily limited to the general electrical inspection and fire department inspections.

1.6 DELIVERY, STORAGE AND HANDLING

- A. The building shall be stored on dunnage placed at the proper locations to prevent cracking, distortion, or any other physical damage.
- B. The building shall be shipped F.O.B. jobsite by the Manufacturer. It shall be provided with Burke lifting fixtures for lifting and setting the building without incurring damage to the walls or roof.
- C. The Building Manufacturer shall provide all cables and lifting hardware for use in off-loading and setting the building.

1.7 GUARANTEE

- A. The manufacturer of the equipment shall guarantee that for one year from the date of project acceptance by the Owner, all equipment shall be free from defects in design, material and workmanship. The manufacturer shall replace in kind any component, major or accessory, supplied as part of the packaged building, whether of his or other manufacture during the guarantee period at no cost to the Owner. Included in the parts replacement are all materials or labor excepting those items which are normally consumed in service such as light bulbs.

PART 2 PRODUCTS

2.1 PRECAST BUILDING

- A. Acceptable Precast Building Manufacturers
 - 1. Manufacturers - Subject to compliance with requirements, provide prefabricated unit of one of the following:
 - a. Oldcastle Infrastructure/EASI-SET™ Buildings Division (Contact: David Worthington: (215)-896-7069)
 - b. Shea Concrete Products (Contact: Frank Dimando: (978)-752-2118)
 - c. United Concrete Products (Contact: Steve Riccitelli: (203)-678-0590)
 - d. or equal.
- B. The precast building enclosure shall be a factory assembled, modular structure and requiring no additional assembly other than as follows:
 - 1. Field installation of the membrane roofing in accordance with specification 07530 - EPDM Sheet Membrane Roofing will also be allowed if the insulation and roofing cannot be installed at the manufacturer's facility.
 - 2. Field installation of related field wiring to connect to the building panel and the field installed pieces of equipment.
- C. The building shall be designed to meet the loading requirements specified on the drawings.

- D. Provide positive anchorage of the precast building to the foundation to resist the uplift and sliding forces that result from the application of the prescribed loads in accordance with building code requirements. Anchorage to provide minimum factors of safety as follows:
 - 1. Against sliding – 1.5
 - 2. Against overturning – 2.0
- E. The precast building shall have minimum interior nominal dimensions shown on the Drawings and 9'-0" high headroom from the floor. All sections shall be constructed of steel-reinforced precast concrete.
- F. The building shall have a minimum thickness as follows:
 - 1. Roof - 6.0 inches
 - 2. Floor - 6.0 inches
 - 3. Wall – 3.5 inches (Total thickness excluding insulation)
- G. The precast concrete building shall be panelized such that the roof and walls are assembled at the manufacturer's facility the building is shipped fully assembled. Precast concrete buildings with the roof and walls cast monolithically at manufacture will also be allowed in accordance with 2.1.B.
- H. Fire Resistance
 - 1. The building shall calculate at a one-hour fireproof rating without affecting the structural properties of the building.
- I. Bullet Resistance
 - 1. The building shall be designed to be maintenance-free and vandal resistant. The building shall be designed for bullet resistance consistent with ANSI/VL threat levels 1 – 4. The bullet envelope shall be bullet proof to a 308 rifle and a steel bullet at 25 feet.
- J. Water Resistance
 - 1. The building shall be entirely assembled at the plant, sealed, waterproofed, and tested for water tightness.

2.2 EXTERIOR BUILDING FINISH

- A. The exterior finish will include the use of a form liner to create a brick appearance. The brick pattern and color shall match the existing treatment plant buildings. A precast concrete building with insulation installed on the exterior surface of the wall with a thin-set exterior building envelope system, (California Brick Stucco minimum 3/16" brick thickness with separate joint and brick colors may also be used. Cement to conform with ASTM C-150 type I and AIR Entrained Hydrated Lime to conform to ASTM C-206-49), will also be allowed in accordance with 2.1.B.3.
- B. The building shall be provided with a sloped, precast concrete roof slab as shown on the drawings.

2.3 INTERIOR BUILDING FINISH

- A. The ceiling and interior walls of the above-grade building shall be finished with ½ inch fiberglass laminated plywood, manufactured by Nudo Products, Inc. or approved equal. Fiberglass lamination shall be 0.030 inches thick, white, with textured finish, and be substantially bonded to ½ inch thick exterior grade plywood.
- B. Fiberglass laminated plywood panels shall be fastened to the concrete walls beneath the insulation board with expansion anchors. Surface mounted moldings shall be used to cover all fasteners.
- C. An additional ¾-inch plywood backer-board shall be used for mounting electrical panels on the west wall.
- D. Backer-board fasteners shall be secured firmly to the underlying concrete wall. The plywood shall be painted white in accordance with Section 09900 to match the laminated plywood panels. The entire surface of the plywood shall be painted prior to surface mounting electrical equipment and panels.

2.4 CONCRETE MATERIALS

- A. The concrete shall have a 28-day compressive strength (f'c) of 5,000 psi and shall meet the requirements of specification 03300 – Cast-in-Place Concrete.

2.5 FORM MATERIALS

- A. Formwork shall be in accordance with specification 03100 – Concrete Forms and Accessories.

2.6 REINFORCEMENT

- A. Reinforcement shall be in accordance with specification 03200 – Concrete Reinforcement.

2.7 FORM LINER FOR ARCHITECTURAL CONCRETE

- A. Provide special forming materials to produce an appearance of brick masonry and mortar in the size and shape of standard brick masonry. The pattern should approximately match the appearance of the existing treatment building walls. Acceptable manufactures include AP Thermoforming, Dayton Superior, Greenstreak, Concrete Rock Surfaces, LLC or approved equal.
- B. Provide a UV stable, concrete penetrating color staining agent. The color shall match the color of the existing building brick masonry. Stain shall be by Sherwin Williams, TNEMEC, or approved equal.
- C. Provide stain color chip samples for selection by the owner.

2.8 FABRICATION

- A. General - Fabricate the precast concrete building complying with manufacturing and testing procedures, quality control recommendations, and dimensional tolerances unless noted otherwise of PCI MNL-116, and as specified for types of units required. Fabrication tolerances (unless more restrictive in PCI MNL-116):
 - 1. Units shall be manufactured and installed so that each unit after erection complies with the following dimensional requirements.

Item	Maximum Deviation
------	-------------------

Span	1/8"
Thickness	1/8"
Openings	1/4"
Out of Square	1/8" per 10'
Bowing and Warpage	1/360 span
Location of Built-In Items:	
Inserts, Bolts, Pipe Sleeves, etc.	3/8"
Flashing Reglets	1/4"

- B. Place concrete in a continuous operation to prevent formation of seams or planes of weakness in precast units. Thoroughly consolidate placed concrete by internal and external vibration without dislocation or damage to reinforcement and built-in items.
- C. Exposed surfaces shall be smooth finished. Form offsets and fins shall be removed and ground smooth. Air pockets and holes larger than ¼ inch in diameter shall be filled with sand-cement paste.
- D. All surfaces of the precast structure shall be smooth, even and free from roughness, irregularities and other defects, and shall be suitable for receiving the interior and exterior finishes specified elsewhere herein.
- E. Exposed edges shall be sharp, straight and square (or Chamfered) and all flat surfaces in a true plane. Warped, cracked, broken, spalled, stained, or otherwise defective units shall be replaced at no additional cost to the Owner.
- F. Identification - Provide permanent markings to identify pickup points and orientation in structure, complying with markings indicated on final shop drawings. Imprint date of casting on each precast unit on a surface, which will not show in finished structure.
- G. Fabricate precast concrete units as detailed in accordance with approved erection drawings and to meet requirements of these specifications.
- H. Provide embedded anchors, insets, plates, angles, and other cast-in items with sufficient anchorage and embedment for design requirements. Provide adequate inserts for lifting and handling precast units. Weld metal inserts in accordance with AWS D12.1. Accurately position built-in anchorage devices and secure to formwork. Locate anchorages where they do not affect position of main reinforcement or placing of concrete.
- I. Pretensioning of tendons for prestressed concrete may be accomplished either by single strand tensioning method or multiple-strand tensioning method. Comply with PCI MNL-116 requirements.
- J. Curing by low-pressure steam, by steam vapor, by radiant heat and moisture, or other similar process may be employed to accelerate concrete hardening and to reduce curing time.
- K. Delay detentioning of prestressed units until concrete has attained at least 70% of design stress, as established by test cylinders.
 - 1. If concrete has been heat-cured, perform detentioning while concrete is still warm and moist, to avoid dimensional changes which may cause cracking or undesirable stresses in concrete.

2. Detensioning of pretensioned tendons may be accomplished either by gradual release of tensioning jacks or by heat cutting tendons, using a sequence and pattern to prevent shock or unbalanced loading.

2.9 GROUT MATERIALS

- A. Non-metallic Shrinkage-Resistant Grout - Pre-mixed, non-metallic, non-corrosive, non-staining product containing selected silica sands, Portland cement, shrinkage compensating agents, plasticizing and water reducing agents. Compressive strength not less than 7,000 psi. at 28 days.
 1. Products - Subject to compliance with requirements, provide one of the following:
 - a. Euco N.S.; Euclid Chemical Co.
 - b. Crystex; L&M Construction Chemicals
 - c. Masterflow 713; Master Builders
 - d. Five Star Grout; U.S. Grout Corp.
 - e. Upcon; Bostik Construction Products
 - f. or equal.

2.10 ACCESS DOOR AND FRAME

- A. The door and frames shall comply with the Steel Door Institute "Recommended Specifications for Standard Steel Doors and Frames", (SDI-100), and as herein specified.
- B. The building shall be outfitted with a 6'-0" x 7'-0" double door.
- C. Please refer to Division 8 - Specification Section 08110 - Steel Doors and Frames for the door and frame requirements.
- D. Please refer to Division 8 - Specification Section 08710 - Door Hardware for the door hardware requirements.
- E. The Contractor shall provide temporary locks for approved cylinders for the construction period. The Contractor shall provide and install City of Beacon master keyed cylinder lock at final completion.

2.11 INSULATING MATERIALS

- A. The roof and walls shall be insulated with rigid polyisocyanurate insulation, thickness as required to provide a minimum R-value of 15.
- B. The entire building foundation shall be insulated with 2" extruded polystyrene foam insulation board, having a minimum R-value of 10. The insulation board shall be moisture resistant and designed for use with exterior below grade walls.
- C. Building insulation shall be in accordance with specification 07210 - Building Insulation.

2.12 ROOFING MATERIALS

- A. The roof shall be a fully adhered ethylene propylene diene Monomer (EPDM) roof and shall include a membrane vapor barrier, coverboard, and a 60 mil EPDM roof.
- B. Roofing shall be in accordance with specification 07530 – Elastomeric Membrane Roofing System (EPDM).

2.13 SHEET METAL FLASHING

- A. Sheet metal flashing shall be in accordance with specification 07620 – Sheet Metal Flashing and Trim.

2.14 SLEEVES AND SEALS

- A. The precast building manufacturer shall provide all wall sleeves and seals. The Contractor is responsible for sizing and coordinating all sleeve locations and elevations.
- B. Wall sleeves shall have seep rings placed on the center of the sleeve and project three inches. Wall sleeves shall be the same length as the wall thickness. Sleeves shall be sized to accommodate compression bolted linked rubber sealing devices. Conduit shall be sealed watertight utilizing compression bolted conduit seals.
- C. Wall sleeves for carrier pipes 1-inch diameter and less shall be Type WSK as manufactured by O.Z. Electrical Manufacturing Company, Brooklyn, NY, Wall-Seal by Dresser Manufacturing, Thunderline, or equal.
- D. Seals between sleeve and carrier pipe shall be made using "Linkseal" as manufactured by Thunderline Corporation, Wayne, Michigan, Red Hed Supply, Viessmann Manufacturing or equal. Sizing of sleeves, selection of link model numbers and sizes shall be in strict accordance with the manufacturer's instructions to ensure watertightness.

2.15 FLOOR OPENING

- A. The building shall have a floor opening for the new water service. The location is to be provided by the building supplier. Upon completion of building installation, the Contractor shall grout floor opening on-site.

2.16 ANCHOR BOLTS AND FASTENERS

- A. All anchor bolts and fasteners shall be 18-8 stainless steel and shall be of ample size and strength for the purpose intended. All anchor bolts shall be installed in accordance with the manufacturer's instructions.

2.17 ELASTOMERIC JOINT SEALANT

- A. Install elastomeric sealant at perimeter joints of the exterior concrete wall and frames of doors, louvers, and wall fans to form a weatherproof, watertight seal.
- B. Provide a one-part nonacid-curing silicone sealant - Type S - Grade NS - Class 25. Comply with joint sealant manufacturer's printed installation instructions. Acceptable products include:
 - 1. Chem-Calk N-Cure 2000 - Bostik Construction Products Div.
 - 2. Dow Corning 790 - Dow Corning Corp.

3. Silglaze N SCS 2501 - General Electric Co.
4. 864 - Pecora Corp.
5. Spectrum 1 - Tremco, Inc.
6. or approved equal.

2.18 HEATING AND VENTILATION COMPONENTS

A. General

1. Provide electrical equipment in accordance with the requirements herein.
2. Exterior design temperatures:
 - a. Winter: Per ASHRAE 97.5% design temperature
3. Interior design temperatures:
 - a. Winter: 65 °F
4. Temperature set points (adjustable) for thermostat:
 - a. Heating: 65°F
5. The building shall be supplied an electric unit heater, an exhaust fan and one or more intake louvers with insect screens.
6. Ventilation fan and louver shall be sized to provide at least 250 cubic feet per minute.
7. The electric unit heater shall be sized to maintain 55°F inside the housing and shall be thermostatically controlled.
8. Exhaust fan and louver shall be painted to match exterior color.
9. All louver and fan wall openings shall be framed by CCA pressure treated lumber and anchored to the concrete wall as shown on the Drawings.

B. Electrical unit heater shall be manufactured by Qmark or approved equal.

C. Exhaust fans shall be manufactured by Cook or approved equal.

D. Provide dehumidifier to maintain a relative humidity of 60%.

2.19 SURFACE PREPARATION AND PAINTING

- A. The at-grade floor slab shall receive one (1) coat of Thoroseal concrete sealer.
- B. The door and frame shall be prime and finish painted in accordance with Section 09900 - Painting and Division 8.

PART 3 EXECUTION

3.1 MANUFACTURER'S RESPONSIBILITIES

A. Support Literature

1. The manufacturer of the building shall be responsible for delivery to the Engineer of four copies of the support literature required herein.

B. Installation Instructions

1. Installation of the building and related appurtenances shall be performed in accordance with written instructions by the manufacturer.

C. Operation and Maintenance Instructions

1. The building manufacturer shall be responsible for supplying written instructions, in three-ring binders, which shall be sufficiently comprehensive to enable the operator to operate and maintain the building and all equipment supplied by the manufacturer.
2. The instructions shall be prepared as a system manual applicable solely to the building and equipment supplied by the manufacturer to these specifications and shall include those devices and equipment supplied by him.
3. The instructions shall include the following:
 - a. Descriptions of, and operating instructions for, each major component of the building as supplied.
 - b. Instructions for operation of the building in all intended modes of operation.
 - c. Instruction for all adjustments which must be performed at initial startup of the building and adjustments which must be performed in the course of preventative maintenance as specified by the manufacturer.
 - d. Electrical schematic diagram of the building as supplied. Wire numbers shall be shown on the schematic. Partial schematics, block diagrams, and simplified schematics shall not be provided in lieu of overall schematic diagram.
 - e. Layout drawing of the building as supplied, prepared in accordance with good commercial practice.
4. Operation and maintenance instructions which are limited to a collection of component manufacturer literature without overall building instructions shall not be acceptable.
5. Operation and maintenance instructions shall be specific to the equipment supplied in accordance with these Specifications. Instruction manuals applicable to many different configurations, and which require the operator to selectively read portions of the instructions shall not be acceptable.

3.2 OFF-LOADING AND INSTALLATION

- A. The building shall be off-loaded by the Building Manufacturer in accordance with the manufacturer's recommendations with assistance from the Contractor. Contractor to provide crane with operator as required by the Building Manufacturer, from which the Building Manufacturer's rigging will hang.
- B. Install structures as indicated, in accordance with manufacturer's written instructions, and in accordance with recognized industry practices to ensure that they comply with requirements and serve intended purposes.
- C. Place precast concrete sections as indicated.

- D. Install rubber joint gasket, complying with ASTM C 1085-91, at joints between sections.
- E. Apply bituminous mastic coating at joints between sections.

3.3 TEST AND INITIAL OPERATION

A. Factory Operational Test

- 1. The entire building package electrical and HVAC systems shall be factory tested by the Factory Quality Assurance personnel for conformance to the Specifications and the Operational Requirements of the building package. The fans, louvers, and heater provided by the precast building manufacturer shall be given an operational test prior to shipping. The Contractor shall verify that all building components have been installed in accordance to applicable building and electrical codes.

B. Initial Operation

- 1. The manufacturer shall provide the services of a factory trained representative for a minimum period of one day to provide initial start-up and testing of the building and to instruct the owner's operating personnel in the operation and maintenance of the equipment provided by them.

3.4 MANUFACTURER'S WARRANTY

- A. Final acceptance of all equipment furnished under these Specifications will be withheld until after the installation and satisfactory field testing.
- B. The building manufacturer shall warrant the building and its contents to be of quality construction, free from defects in material and workmanship for one year from the date of installation.
- C. The precast concrete structure shall endure and not deteriorate for a period of twenty-five (25) years.

END OF SECTION

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SECTION 14601**HOISTS****PART 1 GENERAL****1.1 SECTION INCLUDES**

- A. One 2000-pound portable davit cranes

1.2 RELATED SECTIONS

- A. Section 09900 - Painting.
- B. Section 11000 - Equipment General
- C. Section 16 - Electrical.

1.3 REFERENCES

- A. New York State Building Code, most recent edition.
- B. AGMA Standards.
- C. American National Standards Institute - ANSI/ASME B30.10.
- D. ANSI/ASME B30.11.
- E. ANSI/ASME B30.16.
- F. ANSI MH 27.1.
- G. ANSI MH 27.2.
- H. ANSI/ASME HST-4M
- I. Occupational Safety and Health Administration - OSHA Specification 1910.179.
- J. NEMA Standards.

1.4 SUBMITTALS

- A. 2000-pound portable davit crane:
 - 1. Submit shop drawings showing complete dimensions of the portable davit crane and the required base mounts.
 - 2. Submit catalog cuts fully illustrating and describing the davit crane construction. Mark out non-applicable information.
 - 3. Submit manufacturer's recommended base mount installation methods and required hardware. Submit loads imposed on the davit crane base.
 - 4. Submit manufacturer's installation instructions.

1.5 DELIVERY, STORAGE AND HANDLING

- A. The manufacturer shall match-mark all wiring and mechanical connections before dismantling the equipment for shipment to the site.

1.6 WARRANTY

- A. The manufacturer shall provide a one-year warranty of all furnished equipment.

1.7 FIELD MEASUREMENTS

- A. Verify dimensions in the field before fabrication for items requiring field measurements.

PART 2 PRODUCTS

2.1 GENERAL

- A. Equipment under this Section shall be of the highest quality and amply proportioned for safe and reliable service. Workmanship shall be of the highest grade in all aspects.
- B. Like items of equipment provided hereunder shall be the end products of one manufacturer in order to achieve standardization for appearance, operation, maintenance, spare parts, and manufacturer's service.
- C. All materials shall be properly selected for the stresses to which they will be subjected. Design stresses and safety factors shall be in accordance with ANSI MH 27.1 Specifications.
- D. All welding performed on the crane should conform to the current recommended practices of the AWS (American Welding Society) D14.1.
- E. Welders will have completed a formal certification program for AWS D14.1.
- F. Cranes shall be capable of operation in excessive moisture and corrosive environment.
- M. The acceptable davit crane manufacturers are:
 - 1. Thern Inc., Winona, MN
 - 2. Halliday Products, Orlando, FL
 - 3. Able Industries and Marine Sales, Harahan, LA
 - 4. or approved equal.

2.2 PORTABLE DAVIT CRANE

- A. The portable davit crane must be capable of lifting the new sewage pumps out of the wet well and onto a truck bed for removal from the site.
- B. The portable davit cranes shall have an adjustable boom ranging from 46 to 82 inches in length and shall have the ability to reach a maximum hook height of at least 97 inches. The davit crane boom shall be adjustable in height while under load.
- C. The portable davit crane shall have a hand winch equipped with spur gears or worm gears and have a brake system for load control.
- D. The portable davit crane shall rotate 360 degrees in all base mounts.
- E. The portable davit crane shall have a load rating of 2,000 pounds.

- F. The portable davit crane shall be equipped with 1/4" stainless steel lifting cable of an adequate length to lift objects at least 20 feet below the crane base and raise them 5 feet above the wet well top.
- G. A 1 ton galvanized hook shall be supplied.
- H. The portable davit crane shall have a lifting height of at least 88" above the base mount.
- I. The portable davit crane shall have a max weight of 255 pounds.
- J. The portable davit crane and all hardware shall be 304 stainless steel.

2.3 PORTABLE DAVIT CRANE BASE MOUNTS

- A. One (1) davit crane base mount shall be supplied and installed in the location shown on the drawings. Coordinate the type of base mounts with the installation requirements based on the base mount location.
- B. Base mounts and all mounting hardware shall be entirely 304 stainless steel.
- C. Provide a davit mount cap for when the davit is not in place.

PART 3 EXECUTION

3.1 EQUIPMENT INSTALLATION

- A. Installation shall be in accordance with the manufacturer's instructions and as indicated.
- B. Installation - All parts and equipment at the site shall be protected from weather, damage, abuse, and loss of identification. The installation procedures shall insure that the equipment is installed without initial stresses, forced or improvised fits, misalignments, nicks of high strength structural steel components, stress-raising welds, and rough burrs. After the equipment is installed, any damaged painted surfaces shall be cleaned and repainted.

3.2 FIELD TESTS

- A. Conduct field tests with the equipment in its installed position. Tests shall include a load test in compliance with OSHA requirements and demonstration to the Engineer that under this load condition the equipment will perform satisfactorily throughout the complete load range.

3.3 LUBRICATION

- A. The equipment shall be provided with all necessary lubrication fittings and a supply of lubricant. Before initial start-up onsite, all bearings, gears, etc. shall be lubricated in accordance with manufacturer's recommendations.

END OF SECTION

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SECTION 15050

PIPING - GENERAL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Permit requirements and documentation
2. Sleeves and seals for all wall, floor and roof penetrations
3. Escutcheons
4. Wall Pipes
5. Anchor bolts
6. Pipe and equipment coatings
7. Piping installation
8. Testing
9. Cleaning
10. Pressure testing
11. Disinfection

B. Related Sections

1. Section 09900 - Painting
2. Section 15060 - Hangers and Supports
3. Section 15075 - Mechanical Identification

1.2 REFERENCES

- A. ASTM A778 – Standard Specification for Welded, Unannealed Austenitic Stainless Steel Tubular Products
- B. ASTM A36 – Specification for Carbon Structural Steel
- C. American Water Works Association, AWWA C651, AWWA Standard for Disinfecting Water Mains
- D. New York State Plumbing Code –Disinfection of Potable Water Systems

1.3 SUBMITTALS

- A. Material specifications and shop drawings for all materials and equipment furnished under this Section
- B. Layout drawing for hangers and supports
- C. Certificates of Compliance on all pipe materials

D. Pipeline testing and disinfection procedures

1.4 QUALITY ASSURANCE

- A. The location of all equipment, fixtures, and piping is considered to be approximate only and the Engineer has the right to change at any time before the work is installed, the position of equipment and piping to meet structural conditions, avoid interferences, provide proper clearances or for other sufficient causes. Such changes shall be made without additional expense to the Owner.
- B. Secure all permits and pay all fees required to carry out the piping work. Comply with all laws, ordinances, codes, rules, and regulations of the local and state authorities having jurisdiction over any of the work specified herein. Where provisions of the Contract are in conflict with the codes, the more stringent of either the codes or the Contract Documents shall govern.
- C. The drawings and diagrammatics show the pipe sizes and general routing. Offsets and fittings required to avoid field interferences and provide improved layout shall be provided at no additional cost to the Owner.
- D. All pipe, tube, hose, and fittings in a given specification section shall be the product of a single manufacturer who is experienced in the manufacture of the materials to be furnished. The manufacturer must have provided materials which have been successfully installed and operated for at least 5 years in a similar application.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Care shall be taken in loading, transporting, and unloading to prevent damage to the pipe or coatings. Pipe or fittings shall not be dropped. All pipe or fittings shall be examined before installing, and no piece shall be installed which is found to be defective. Any damage to the pipe linings or coatings shall be repaired as directed by the Engineer at no additional cost to the Owner.
- B. If any defective pipe is discovered after it has been installed, it shall be removed and replaced with a sound pipe in a satisfactory manner. All pipe and fittings shall be thoroughly cleaned before installing, shall be kept clean until they are used in the work, and when installed shall conform to the lines, grades and dimensions required.
- C. Provide factory-applied plastic end-caps on each length of pipe and tube. Maintain end-caps through shipping, storage and handling to prevent pipe-end damage and prevent entrance of dirt, debris, and moisture. Protect stored pipes and tubes. Elevate above grade and enclose with durable, waterproof wrapping. When stored inside, do not exceed structural capacity of the floor. Protect flanges, fittings, and specialties from moisture and dirt by inside storage and enclosure, or by packaging with durable, waterproof wrapping.

PART 2 PRODUCTS

2.1 MATERIALS

- A. All materials used for public water systems or plumbing system providing water for human consumption shall be lead free as defined by the Reduction of Lead in Drinking Water Act.

- B. Sleeves and Seals - Furnish all sleeves required under this Division. Coordinate the sleeve locations and elevations for placement.
1. Sleeves will be required at the locations shown on the Drawings or as specified herein. The type of wall penetration shown on the Drawings shall govern over the summary presented herein.
 2. Sleeves shall be Schedule 5S stainless steel in accordance with ASTM A-778 with seep rings. Seep rings shall be welded continuous, placed on the center of the sleeve and project 3 inches. Floor sleeves shall be 3 inches longer than the floor slab depth and shall project 3 inches above finish floor level for housekeeping purposes. Wall sleeves shall be the same length as the wall thickness. Sleeves passing through partition walls do not require seep rings.
 3. Sleeves for carrier pipes 1 inch diameter and less shall be Type WSK as manufactured by O.Z. Electrical Manufacturing Company, Brooklyn, NY, Wall-Seal by Dresser Manufacturing, GPT/Thunderline, or equal.
 4. HVAC Sleeves:
 - a. Sleeves for Pipes Through Non-fire Rated Floors: 18 gage thick galvanized steel.
 - b. Sleeves for Pipes Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage thick galvanized steel.
 - c. Sleeves for Round Ductwork: Galvanized steel.
 - d. Sleeves for Rectangular Ductwork: Galvanized steel or wood.
 - e. Sealant: Acrylic.
 5. Sleeves with seals as described hereinafter shall be used for all carrier pipes larger than 1 inch in diameter. Seals between steel sleeve and carrier pipe shall be made using "Linkseal" as manufactured by GPT/Thunderline Corporation, Pen-Seal as manufactured by Proco Products, Innerlynx or equal. Sizing of sleeves, selection of link model numbers and sizes shall be in strict accordance with the manufacturer's instructions to ensure watertightness.
 - a. Same environment on both sides of wall or floor - sleeves are required. No seal between the pipe and sleeve is required in these locations.
 - b. Pipes passing through foundation walls with soil on both sides - pipes shall pass through an oversized opening. Sleeves with seals are not required at these locations.
 - c. Sanitary soil pipes, floor drain pipes, and roof drain pipes passing through walls and floors between areas of different environments - water stopped sleeves shall be used and sealed as described above.
 6. Pipes penetrating a concrete floor poured on soil above grade shall be poured in place. Pipes shall be fully isolated with full depth, ¼ inch thick, self-expanding cork or other bond-breaking material held securely in place during concrete placement. The annular space at finish floor shall be caulked.
- C. Escutcheons - Where uncovered pipe passes through finished walls or ceilings, a chrome plated escutcheon shall be provided.

- D. Wall Pipes - Wall pipes shall be provided where called for on the Drawings. Wall pipes shall be provided with a 3 inch high seep ring welded continuous and placed on the center of the pipe. Seep ring shall be ASTM A36 steel, minimum ¼ inch thick. Wall pipe interior shall be finished equal to main line with end connections as required (MJ, Flanged, PE, Push-on Bell).
- E. Anchor Bolts - Anchor bolts, nuts, washers, and bolt sleeves shall be Type 316 stainless steel. Expansion bolts shall be "Thunderstuds," as manufactured by Unifast Industries, Inc., Hauppauge, NY, Redhead "Wedge Anchors" as manufactured by ITT Phillips; Michigan City, Indiana or Molly parabolt as manufactured by USM Corporation, Shelton, CT. All expansion bolts and associated hardware shall be stainless steel.

2.2 FINISHES

- A. Pipe and Equipment Coatings - The prime and field applied coatings shall conform to the requirements of Section 09900. Prime coats must be compatible with the paint system approved for this project.
 - 1. Exposed piping shall be painted in accordance with the individual pipe specification section and Section 09900.

PART 3 EXECUTION

3.1 PREPARATION

- A. Clean and prepare pipe joints to be free of scale, dirt, and debris prior to connections.
- B. Comply with the surface preparation requirements outlined in Section 09900 for all piping, supports and hangers.

3.2 INSTALLATION

- A. Work shall be installed in accordance with the manufacturer's printed instructions and shall be plumb and true to line. Install piping as close to walls, and ceilings as possible yet facilitating maintenance and access to valves and devices. In general, piping systems shall parallel walls, partitions, and structural members. Offsets and fittings to accomplish a neat and workmanlike installation shall be provided at no additional cost to the Owner. Piping shall be installed true to the grades required as shown on the Drawings.
- B. Take care that stresses are not imposed on the pipe during installation.
- C. Concrete inserts for hangers and supports shall be furnished and installed in the concrete as it is placed. The inserts shall be set in accordance with the requirements of the piping layout and joint method and their locations shall be verified from approved piping layout drawings and the structural drawings. Layouts for hanger and supports shall be submitted to the Engineer for approval. Pipe hangers and supports shall conform to the requirements of Section 15060.
- D. All valves, fittings, and appurtenances needed on the pipelines shall be set and jointed as indicated on the Drawings or as required.
- E. Equipment Connections - Provide unions and control valves on services to equipment provided under other Sections. All valves are to be installed in the upright position.

Valves shall be installed and located so they can be operated easily and shall be located adjacent to the equipment.

- F. Unions - All piping 2 inches and smaller shall have a sufficient number of unions to allow convenient removal of piping and shall be as approved by the Engineer.
- G. Cutting and Patching - Sleeves not initially set in the work shall be cut in place with permission of the Engineer. This work shall be performed by workmen competent to do the work and equipped with proper hand tools. Power tools with the exception of core boring machines shall not be used.
- H. Welding - Welding shall only be performed by certified welders tested in the position applicable to the work. Welding shall be performed in accordance with AWS standards. Copies of welding certifications shall be provided to the Engineer.
- I. Pipe identification and marking shall be in accordance with Section 15075.

3.3 REPAIR/RESTORATION

- A. During the course of the Work, protect all materials, fixtures, and equipment from damage. Any damage to piping, linings or coatings shall be repaired to the satisfaction of the Engineer or replaced.

3.4 CLEANING

- A. At the completion of the Work, thoroughly clean all piping and equipment installed. Remove all concrete, stickers, rust stains, foreign matter and discoloration. Piping and equipment shall be in a thoroughly clean condition and ready for finish painting.
- B. All potable water piping shall be thoroughly flushed and disinfected prior to placing in service in a manner approved by the Engineer.

3.5 PRESSURE TESTING

- A. Testing - Test all piping systems in accordance with the piping section requirements or to the code applicable to the location where the work is performed. Pipes shall hold pressure without the addition of water or additional pumping. Additional tests or methods may be required by local ordinances or inspection authorities. Tests shall be repeated as necessary to make the systems tight and accepted. Provide all water, air, or gas, apparatus, gauges, and materials necessary for performing tests.
- B. Provide all equipment, materials, and apparatus to conduct pressure tests as required by code or the individual piping sections. All tests shall be witnessed by the Engineer. Any leaks shall be repaired and the pipe retested to the Engineer's satisfaction.
- C. Test pressure and duration shall be as specified in the individual piping sections.

END OF SECTION

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SECTION 15060**HANGERS AND SUPPORTS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes
 - 1. Concrete pipe supports
 - 2. Manufactured piping hangers and supports
 - 3. Miscellaneous materials
 - 4. Pipe alignment guides
- B. Related Sections
 - 1. Section 03300 - Cast-in-Place Concrete
 - 2. Section 15050 - Piping - General

1.2 REFERENCES

- A. Manufacturers' Standardization Society SP-58, Pipe Hangers and Supports - Materials Design and Manufacture, Selection and Application, Fabrication and Installation Practices
- B. Manufacturers' Standardization Society SP-90, Guidelines on Terminology for Pipe Hangers and Supports
- C. ASTM A 36 - Specification for Structural Steel
- D. ASTM A 123 - Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- E. ASTM A 780 - Practice for Repair of Damaged Hot Dipped Galvanized Coatings
- F. ASTM B 633 - Specification for Electrodeposited Coatings of Zinc on Iron and Steel
- G. ASTM C 150 - Specification for Portland Cement
- H. ASTM C 404 - Specification for Aggregates for Masonry Grout
- I. ASME B 31.9 - Building Services Piping
- J. American Welding Society (AWS) Structural Welding Code
- K. New York State Building Code, most recent edition

1.3 DESIGN REQUIREMENTS

- A. Mechanical components and systems and their attachments shall be designed in accordance with ASCE 7-05, Section 13.6 Mechanical and Electrical Components, the International Building Code (IBC 2009).
- B. The design of each pipe support and pipe support framework shall be the responsibility of the Contractor. Shop drawings, as specified below, shall be submitted and shall

show all details of the installation, including dimensions and types of support. In all instances, the completed frame shall be adequately braced to provide a complete rigid structure when all piping has been attached.

- C. Shop Drawings for hangers, supports, mechanical attachments, and for all associated structural steel framework shall be stamped by a Professional Engineer registered in the state of New York.

1.4 SUBMITTALS

- A. Product data, including installation instructions for each type of support and anchor. Submit pipe hanger and support schedule showing Manufacturer's figure number, size, location, and features for each required pipe hanger and support.
- B. Product certificates signed by the manufacturer of hangers and supports certifying that their products meet the specified requirements and complies with Manufacturers' Standardization Society Standards.
- C. Welder certificates signed by Contractor certifying that welders comply with requirements specified under "Quality Assurance" Article.
- D. Assembly-type shop drawings for each type of support and anchor, indicating dimensions, weights, required clearances, and methods of assembly of components.

1.5 QUALITY ASSURANCE

- A. Provide anchors and supports in conformance with the Manufacturers Standardization Society of the Valve and Fitting Industry, Inc. (MSS). All materials, design, manufacture, selection, application and fabrication shall be in conformance with the appropriate MSS numbers.
- B. Qualify welding processes and welding operators in accordance with AWS D1.1 "Structural Welding Code-Steel."
 - 1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has underground re-certification.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Manufactured Piping Hangers and Supports - Hangers and support components shall be factory fabricated of materials, design, and manufacturer complying with MSS SP-58.
 - 1. Components shall be stainless steel where installed for stainless steel piping. As a minimum, components to be stainless steel include clevis hangers, pipe clamps, pipe supports, plate bases, pipe saddles, U-bolts, floor stanchions, threaded rod with nuts, rod couplings, brackets and all miscellaneous connecting and supporting hardware. Structural steel work required for pipe racks and trapezes shall be A-36 steel, sandblasted, primed and finish painted using the approved paint system for this project.
 - 2. As a minimum, all components shall have hot-dipped galvanized coatings where installed for all other piping and equipment.

3. Components shall have a plastic coating where installed for piping and equipment in chemical feed areas.
4. Pipe attachments shall have plastic coating for electrolytic protection where attachments are in direct contact with copper tubing.
5. Hangers and supports with a copper coating will not be acceptable.
6. All hangers and supports shall have some form of adjustment available after installation.
7. Hanger rods shall be subjected to tension only. Lateral and axial movements shall be accommodated by proper linkage in the rod assembly.
8. Strut channel hangers shall be used to support parallel piping. Strut clamps, straps, and rollers shall be used to maintain proper alignment. Thermal expansion roller hangers shall be utilized for all heating supply and return lines. Strut channel trapeze hanger systems shall be hot-dipped galvanized after fabrication (ASTM A123). Hardware shall be electro-plated zinc (ASTM B633).
9. Floor supported process piping shall be supported by pipe supports which are provided with a base stand secured to the concrete using stainless steel anchors, adjustable shank, saddle, U-bolt, and hex nuts to hold pipe securely to the saddle.

B. Miscellaneous Materials

1. Steel Plates, Shapes, and Bars shall conform to ASTM A 36.
2. Cement Grout - Portland cement (ASTM C 150, Type I or Type III) and clean uniformly graded, natural sand (ASTM C 404, Size No. 2). Mix ratio shall be 1.0 part cement to 3.0 parts sand, by volume, with minimum amount of water required for placement and hydration.

- C. Pipe Alignment Guides -** Factory fabricated, of cast semi-steel or heavy fabricated steel, consisting of bolted two-section outer cylinder and base with two-section guiding spider that bolts tightly to pipe. Length of guides shall be as recommended by manufacturer to allow indicated travel.

PART 3 EXECUTION

3.1 EXAMINATION

- A.** Examine substrates and conditions under which supports and anchors are to be installed. Do not proceed with installing until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A.** Install hangers, supports, clamps and attachments to support piping properly from building structure; comply with MSS SP-58.
- B.** Arrange for grouping of parallel runs of horizontal piping supported together on field-fabricated, heavy-duty trapeze hangers where possible. Where piping of various sizes is supported together by trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipe as specified above for individual pipe

hangers. Fabricate from steel shapes selected for loads required; weld steel in accordance with AWS D-1.1.

- C. Install supports with maximum spacings complying with MSS SP-58.
- D. Install supports with minimum rod diameter complying with MSS SP-58.
- E. Install building attachments within concrete or to structural steel. Space attachments within maximum piping span length indicated in MSS SP-58. Install additional attachments at concentrated loads, including valves, flanges, guides, strainers, expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten insert to forms. Where concrete with compressive strength less than 2,500 psi is indicated, install reinforcing bars through openings at top of inserts.
- F. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.
- G. Install hangers and supports to allow controlled movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends and similar units.
- H. Install hangers and supports so that piping live and dead loading and stress from movement will not be transmitted to connected equipment.
- I. Install hangers and supports to provide indicated pipe slopes, and so that maximum pipe deflections allowed by ASME B31.9 Building Services Piping Code is not exceeded.
- J. Insulated Piping - Comply with the following installation requirements.
 - 1. Clamps - Attach clamps, including spacers (if any), to piping with clamps projecting through insulation; do not exceed pipe stresses allowed by ASME B31.9.
 - 2. Saddles - Install protection saddles MSS Type 39 where insulation without vapor barrier is indicated. Fill interior voids with segments of insulation that match adjoining pipe insulation.
 - 3. Shields - Install protective shields MSS Type 40 on cold and chilled water piping that has vapor barrier. Shields shall span an arc of 180 degrees and shall have dimensions in accordance with MSS SP-58.
 - 4. Pipes 8 inch and larger shall have wood inserts.
 - 5. Insert material shall be at least as long as the protective shield.
 - 6. Thermal Hanger Shields - Install where indicated, with insulation of same thickness as piping.

K. Anchors

1. Install anchors at proper locations to prevent stresses from exceeding those permitted by ASME B31.9 and to prevent transfer of loading and stresses to connected equipment.
2. Fabricate and install anchors by welding steel shapes, plates, and bars to piping and to structure. Comply with ASME B31.9 and with AWS Standards D1.1.
3. Anchor Spacings - Where not otherwise indicated, install anchors at ends of principal pipe runs. Make provisions for preset of anchors as required to accommodate both expansion and contraction of piping.

L. Pipe Alignment Guides

1. Install pipe alignment guides on piping that adjoins expansion joints and elsewhere as indicated.
2. Anchor to building substrate.

M. Equipment Supports

1. Fabricate structural steel stands to suspend equipment from structure above or support equipment above floor.
2. Grouting - Place grout under supports for piping and equipment.

N. Shelf Bracket Supports

1. Anchor brackets into concrete wall using anchors specified in Section 15050.

3.3 CONSTRUCTION

- A. Cut, drill, and fit miscellaneous metal fabrications for pipe anchors and equipment supports. Install and align fabricated anchors in indicated locations.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding - Comply with AWS D1-1 for procedures of manual shielded metal-arc welding, appearance and quality of welds made, methods used in correcting welding work, and the following:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. Finish welds at exposed connections so that no roughness shows after finishing, and so that contoured welded surfaces match adjacent contours.

3.4 ADJUSTING

- A. Hanger Adjustment - Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

3.5 CLEANING

- A. For galvanized surfaces clean welds, bolted connections, and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

END OF SECTION

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SECTION 15075

MECHANICAL IDENTIFICATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Painted Identification Materials
2. Plastic Pipe Markers
3. Valve Tags
4. Plastic Equipment Markers
5. Plasticized Tags

B. Related Sections

1. Section 09900 - Painting
2. Division 15 Sections which specify pipe and valve marking and identification.

1.2 REFERENCES

- A. ANSI Standards - Comply with ANSI A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

1.3 SUBMITTALS

- A. Manufacturer's technical product data and installation instructions for each identification material and device required.
- B. Samples of each color, lettering style and other graphic representation required for each identification material or system.

1.4 QUALITY ASSURANCE

- A. Mechanical identification materials shall be provided by firms regularly engaged in manufacture of identification devices of types and sizes required and whose products have been in satisfactory use in similar service for not less than 5 years.

1.5 MAINTENANCE

A. Extra materials

1. Furnish minimum of 5% extra stock of each mechanical identification material required, including additional numbered valve tags (not less than 3) for each piping system, additional piping system identification markers, and additional plastic laminate engraving blanks of assorted sizes.
2. Where stenciled markers are provided, clean and retain stencils after completion of stenciling and include used stencils in extra stock, along with required stock of stenciling paints and applicators.

PART 2 PRODUCTS**2.1 MANUFACTURERS**

- A. Subject to compliance with requirements, provide mechanical identification materials of one of the following or equal:
 - 1. Allen Systems, Inc.
 - 2. Brady (W.H.) Co.; Signmark Div.
 - 3. Seton Name Plate Corp.

2.2 MATERIALS

- A. Mechanical Identification Materials
 - 1. Provide manufacturer's standard products of categories and types required for each application as referenced in other Division 15 sections. Where more than single type is specified for application, selection is installer's option, but provide single selection for each product category.
- B. Painted Identification Materials
 - 1. Provide standard fiberboard stencils, prepared for required applications with letter sizes generally complying with recommendations of ANSI A13.1 for piping and similar applications, but not less than 1-1/4 inch high letters.
 - 2. Utilize standard exterior type stenciling enamel; black, except as otherwise indicated; either brushing grade or pressurized spray-can form and grade.
 - 3. Utilize standard identification enamel of colors indicated or, if not otherwise indicated for piping systems, comply with ANSI A13.1 for colors.
- C. Valve Tags
 - 1. Provide 19-gauge polished brass valve tags with stamp-engraved piping system abbreviation in 1/4 inch high letters and sequenced valve numbers 1/2 inch high, and with 5/32 inch hole for fastener.
 - a. Provide 1-1/2 inch diameter tags, except as otherwise indicated.
 - b. Provide size and shape as specified or scheduled for each piping system.
 - c. Fill tag engraving with black enamel.
 - 2. Provide manufacturer's standard solid brass chain (wire link or beaded type), or solid brass S-hooks of the sizes required for proper attachment of tags to valves, and manufactured specifically for that purpose.
 - 3. Provide manufacturer's standard 1/16-inch thick engraved plastic laminate access panel markers, with abbreviations and numbers corresponding to concealed valve. Include 1/8-inch center hole to allow attachment.
- D. Plastic Equipment Markers
 - 1. Provide manufacturer's standard laminated plastic, color coded equipment markers. Conform to the following color code:

- a. Green - Cooling equipment and components.
 - b. Yellow - Heating equipment and components.
 - c. Yellow/Green - Combination cooling and heating equipment and components.
 - d. Blue - Equipment and components that do not meet any of the above criteria.
 - e. For hazardous equipment, use colors and designs recommended by ANSI A13.1.
2. Include the following, matching terminology on schedules as closely as possible:
 - a. Name and plan number.
 - b. Equipment service.
 - c. Design capacity.
 - d. Other design parameters such as pressure drop, entering and leaving conditions, rpm, etc.
 3. Provide approximate 2-1/2 inch by 4 inch markers for control devices, dampers, and valves; and 4-1/2 inch by 6 inch for equipment.

E. Plasticized Tags

1. Manufacturer's standard pre-printed or partially pre-printed accident-prevention tags, of plasticized card stock with matt finish suitable for writing approximately 3-1/4 inch by 5-5/8 inch, with brass grommets and wire fasteners and with appropriate pre-printed wording including large-size primary wording (as examples; DANGER, CAUTION, DO NOT OPERATE).

F. Lettering and Graphics

1. Coordinate names, abbreviations and other designations used in mechanical identification work, with corresponding designations shown, specified or scheduled. Provide numbers, lettering and wording indicated or, if not otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of mechanical systems and equipment.
2. Where multiple systems of same generic name are shown and specified, provide identification which indicates individual system number as well as service (as examples; Boiler No. 3, Air Supply No. 1H, Standpipe F12).

PART 3 EXECUTION

3.1 INSTALLATION

- A. Where identification is to be applied to surfaces which require insulation, painting or other covering or finish, including valve tags in finished mechanical spaces, install identification after completion of covering and painting. Install identification prior to installation of removable concealment, if any.

B. Piping System Identification

1. Install pipe markers on force main pipes include arrows to show normal direction of flow.
2. Locate pipe markers and color bands as follows wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums) and exterior non-concealed locations.
 - a. Near each valve and control device.
 - b. Near each branch, excluding short take-offs for fixtures and terminal units; mark each pipe at branch, where there could be question of flow pattern.
 - c. Near locations where pipes pass through walls or floors/ceilings, or enter non-accessible enclosures.
 - d. At access doors, manholes and similar access points that permit view of concealed piping.
 - e. Near major equipment items and other points of origination and termination.
 - f. Spaced intermediately at maximum spacing of 50 feet along each piping run, except reduce spacing to 25 feet in congested areas of piping and equipment.

C. Valve Identification

1. Provide valve tag on every valve, cock and control device in each piping system; exclude check valves, valves within factory-fabricated equipment units, plumbing fixture faucets, convenience and lawn-watering hose bibs, and shut-off valves at plumbing fixtures, HVAC terminal devices and similar rough-in connections of end-use fixtures and units. List each tagged valve in valve schedule for each piping system.

D. Mechanical Equipment Identification

1. Install engraved plastic laminate sign or plastic equipment marker on or near each major item of mechanical equipment and each operational device, as specified herein if not otherwise specified for each item or device. Provide signs for the following general categories of equipment and operational devices:
 - a. Main control and operating valves, including safety devices and hazardous units.
 - b. Meters, gauges, thermometers and similar units.
 - c. Pumps, compressors, condensers and similar motor-driven units.
 - d. Fans, blowers, primary balancing dampers and mixing boxes.
 - e. Packaged HVAC central-station or zone-type units.
 - f. Tanks and pressure vessels.
 - g. Strainers, filters, water treatment systems and similar equipment.

2. Where lettering larger than 1 inch height is needed for proper identification, because of distance from normal location of required identification, stenciled signs may be provided in lieu of engraved plastic, at Installer's option.
3. Minimum ¼ inch high lettering for name of unit where viewing distance is less than 2 feet, ½ inch high for distances up to 6 feet and proportionately larger lettering for greater distances. Provide secondary lettering of 67% to 75% of size of the principal lettering.
4. In addition to name of identified unit, provide lettering to distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.
5. At Installer's option, where equipment to be identified is concealed, plasticized tags may be installed within concealed space to reduce amount of text in exposed sign (outside concealment).
 - a. Operational valves and similar minor equipment items located in non-occupied spaces (including machine rooms) may, at Installer's option, be identified by installation of plasticized tags in lieu of engraved plastic signs.

3.2 ADJUSTING

- A. Relocate any mechanical identification device which has become visually blocked by work of this division or other divisions.

3.3 CLEANING

- A. Clean face of identification devices.

END OF SECTION

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SECTION 15110**VALVES****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes
 - 1. Manual Operators
 - 2. Gate Valves
 - 3. Ball Valves
 - 4. Plug Valves
 - 5. Check Valves
 - 6. Valve Boxes
- B. Related Sections
 - 1. Section 09900 - Painting

1.2 REFERENCES

- A. ASTM A126 - Specifications for Gray Iron Castings for Valves, Flanges, and Pipe Fittings
- B. ASTM A536 - Specifications for Ductile Iron Castings
- C. ASTM B62 - Specification for Composition Bronze or Ounce Metal Castings
- D. ASTM D1784 - Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
- E. ASTM D4101 - Specification for Propylene Plastic Injection and Extrusion Materials
- F. AWWA C507 - Standard Specification for Ball Valves, 6 In. through 48 In.
- G. AWWA C550 - Standard for Protective Interior Coatings for Valves and Hydrants
- H. AWWA C800 - Standard for Underground Service Line Valves and Fittings

1.3 SUBMITTALS

- A. Product data including body material, valve design, pressure and temperature classification, end connection details, seating materials, trim material and arrangement, dimensions and required clearances, and installation instructions.
- B. Wiring diagrams, product and performance data for electrical and pneumatic actuators, electric check valves, solenoid valves and pump directors.
- C. Performance and sizing data for air release valves including manufacturer's recommended sizing requirements.

- D. Valve operating and seating torques for all valves equipped with electric or pneumatic actuators.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Ensure valves are dry and internally protected against rust and corrosion.
 - 2. Protect valve ends against damage to threads, flange faces, and weld-end preps.
 - 3. Set valves in best position for handling. Set globe and gate valves closed to prevent rattling; set ball valves open to minimize exposure of functional surfaces; set butterfly valves closed or slightly open; and block swing check valves in either closed or open position.
- B. Use the following precautions during storage:
 - 1. Do not remove valve end protectors unless necessary for inspection; then reinstall for storage.
 - 2. Protect valves from weather. Store valves indoors. Maintain valve temperature higher than the ambient dew point temperature. If outdoor storage is necessary, support valves off the ground or pavement in watertight enclosures.
- C. Use a sling to handle valves whose size requires handling by crane or lift. Rig valves to avoid damage to exposed valve parts. Do not use handwheels and stems as lifting or rigging points.

1.5 OPERATION AND MAINTENANCE MANUALS

- A. Provide O&M manuals for all valves in accordance with section 01770.

PART 2 PRODUCTS

2.1 GENERAL

- A. Pressure and Temperature Ratings - As scheduled and required to suit.
- B. Sizes - Same size as upstream pipe, unless otherwise indicated.
- C. Extended Stems - Where insulation is indicated or specified, provide extended stems arranged to receive insulation.
- D. Valves shall have the same end connections and an equivalent or higher pressure rating as the pipeline in which it is installed.
- E. All materials used for public water systems or plumbing system providing water for human consumption shall be lead free as defined by the Reduction of Lead in Drinking Water Act.

2.2 MANUAL OPERATORS

- A. Provide lever handles for quarter-turn valves 4 inches and smaller. Provide one lever handle for each valve supplied.
- B. Valves 6 inches and larger shall be equipped with gear actuators capable of withstanding an overload input torque of 450 ft/lbs at full open or closed positions

without change to the valve or valve operation. All gearing shall be enclosed with seals provided on all shafts to prevent entry of dirt and water into the actuator. All shaft bearings shall be furnished with permanently lubricated bronze bearing bushings. Actuator housing shall be cast iron (ASTM A126 Class B).

- C. Manual actuator hand wheels shall be furnished on valves 6 inches and larger. Valves shall be mounted vertically with right angle drive actuators. All components of the actuators shall be designed to withstand, without damage, a pull of 200 pounds as required by AWWA C504 - Section 12.3. Actuators shall be designed to close with an effort of less than 40 pounds torque.

2.3 GATE VALVES (RESILIENT SEAT)

- A. Gate valves shall be resilient seat type suitable for underground service complying with the requirements of AWWA C509 or C515. C509 valves shall be cast iron or ductile iron. C515 gate valves shall be ductile iron.
- B. Gate valves shall be designed to be bubble tight for 250 psig water working pressure with no leakage past the seat from either side of the disc, and shall be hydrostatically tested to 500 psig.
- C. Gate valves shall be of the non-rising stem (N.R.S.) design.
- D. Gate valves shall be set vertically (spur gearing).
- E. Gate valves shall open left (counter-clockwise).
- F. Buried gate valves shall be furnished with 2 inch square operating nuts and mechanical joint ends.
- G. Cast iron shall meet the specifications of ASTM A126, Class B. Castings shall be clean and sound without defects that will impair their service. No plugging or welding of such defects will be allowed. Ductile iron shall meet the standards of ASTM A536.
- H. The resilient-seated disc wedge shall be of the resilient wedge fully supported type, either cast iron or ductile iron. Solid guide lugs shall travel within channels in the body of the valve. The disc and guide lugs shall be fully encapsulated in SBR (styrene butadiene rubber) or EPDM rubber. Disc wedges that are not 100% fully encapsulated shall not be acceptable. Provide guide caps of an acetal copolymer bearing material to protect the rubber-encapsulated solid guide lugs from abrasion for long life and ease of operation.
- I. The seat shall be SBR or EPDM rubber, matching the disc encasement. The seating surface (rubber) shall be specially designed so as to provide a smooth waterway, without depressions or cavities, which might trap debris and interfere with tight closures.
- J. The body, bonnet, and gate shall be cast/ductile iron, constructed in accordance with AWWA C509 or C515. The bonnet to body seal shall incorporate a flat neoprene gasket. Bonnet and body flanges shall be fully machined to assure proper sealing of the gasket.
- K. Gate valve stems shall be of bronze rolled bar stock in accordance with ASTM B584, and shall have a forged thrust collar. The thrust collar shall be factory lubricated, and the thrust collar and its lubrication shall be isolated by the O-Rings from the water

way and from outside contamination, providing permanent lubrication for long term ease of operation. An anti-friction thrust washer shall be provided both above and below the thrust collar for ease of operation.

- L. Gate valves shall have O-Ring sealed stems with one O-Ring located below the thrust collar and two O-Rings located above the thrust collar. The two O-Rings located above the thrust collar shall be replaceable with the valve still in service in the fully open position.
- M. Coat internal and external exposed ferrous surfaces of the valve with a fusion-bonded, thermosetting powder epoxy coating suitable for potable water service conforming to AWWA C550. Coating shall be non-toxic and shall impart no taste to water. Coating thickness shall be nominal 10 mils.
- N. Seal internal and external exposed ferrous surfaces of the valve with two coats of asphaltic varnish (5 mils) suitable for potable water service conforming to AWWA C550. Coating shall be non-toxic and shall impart no taste to water. Coating thickness shall be nominal 10 mils. Gate valves for water distribution systems shall be certified to NSF 61.
- O. Gate valves shall be as manufactured by U.S. Pipe Metroseal (Model 250), Mueller (Model 2360), American Flow Control (AFC-2500), Clow (2630 Series), equivalent by M&H Valve Company, or equal.

2.4 BALL VALVES

- A. Ball valves, 1½ inch and smaller - rated for 150 psi saturated steam pressure, 600 psi WOG pressure; two-piece adaptor load construction; with bronze body conforming to ASTM B 62, single reduced port, chrome-plated brass ball, glass reinforced "Teflon" or "TFE" seats and seals, blowout-proof stem, soldered, screwed or flanged ends, and vinyl-covered steel handle.
- B. Ball Valves, 2 inch and larger - Rated for 150 psi saturated steam pressure, 600 psi WOG pressure; 3-piece construction; with bronze body conforming to ASTM B 62, single reduced port, chrome-plated brass ball, glass reinforced Teflon or "TFE" seats and seals blowout proof stem, soldered, screwed or flanged ends, and vinyl-covered steel handle.
- C. Ball Valves - Stainless steel, flanged or threaded ends, all sizes, shall be Type 316 stainless steel body, ball, stem, cap and packing gland. Packing and seats shall be Teflon. Flanged valves shall be Class 150, threaded valves shall be rated for 100 psi at 400°F.
- D. Ball valves shall be Nibco Chemtrol Tru-Bloc, Asahi/America Duo-Bloc, Spears True Union, Hayward, Ipex, or equal.

2.5 PLUG VALVES (NON-LUBRICATED)

- A. Plug valves shall be quarter-turn non-lubricated, eccentric type with resilient faced plug.
- B. The interior and exterior of the valve shall be coated with an ANSI/NSF 61 approved fusion bonded epoxy.

- C. Valve body casting shall be ASTM A126 Class B cast iron using high pressure molding techniques for a working pressure of 175 psig (2½ inch to 12 inch) and 150 psi (14 inch to 36 inch).
- D. Provide flanged ends. Flange diameter, thickness and drilling shall conform to ANSI B16.1 Class 125.
- E. Provide a welded 90% nickel seat for corrosion and erosion resistance specially profiled for low torque and extended seat life.
- F. The plug shall be of one-piece construction and made of ASTM A126 Class B cast iron with resilient facing per ANSI/AWWA C504 requirements.
- G. Radial shaft bearings shall be constructed of self-lubricating Type 316 stainless steel. The top thrust bearing shall be Teflon. The bottom thrust bearing shall be Type 316 stainless steel. Cover bolts shall be corrosion resistant with zinc plating.
- H. Provide permanently lubricated 316 grade stainless steel bearings located in the body and bonnet, along with upper and lower PTFE thrust washers, to ensure consistently low operating torque.
- I. Provide round or rectangular port full bore design with streamlined internal contours for high capacity straight through flow in the full open position, reducing turbulence and pressure drop and the effect of erosive media.
- J. All valves shall be open to the left (counter-clockwise).
- K. Plug valves shall be manufactured by DeZurik, Milliken, Valmatic, or equal.

2.6 CHECK VALVES

- A. Swing Check Valves, 2 inch and smaller - MSS SP-80; Class 125, cast-bronze body and cap conforming to ASTM B 62; with horizontal swing, and bronze disc; and having threaded or solder ends. Provide Class 150 valves meeting the above specifications, with threaded end connections, where system pressure requires or where Class 125 valves are not available.
- B. Swing Check Valves, 2½ inch and Larger
 - 1. Check valves shall be all iron body, bronze mounted, full opening swing type. Valve clapper shall swing completely clear of the waterway when valve is full open, permitting a "full flow" thru the valve equal to the nominal pipe diameter. Check valves shall comply with AWWA Standard C-508 latest revision.
 - 2. Check Valves shall be rated at 175 psi water working pressure, 350 psi hydrostatic test for structural soundness. Seat tightness at rated working pressure shall be in accordance with AWWA C508.
 - 3. Check valves shall be furnished with 125# ANSI flanged ends.
 - 4. All cast iron shall conform to ASTM-A-126 Class B. Castings shall be clean and sound without defects that will impair their service. No plugging or welding of such defects will be allowed. Clapper shall be all bronze for sizes through 4 inch and cast iron, bronze faced for sizes 6 inch and larger. Hinge pins shall be 18-8 Stainless Steel rotating in bronze plugs. Bolts shall be electro-

zinc plated steel with hex heads and hex nuts in accordance with ASTM A-307 and A-563, respectively.

5. Check valves shall be constructed to permit top entry for complete removal of internal components without removing the valve from the line. Glands shall be O-rings. Check valves shall be equipped with adjustable outside lever and spring or lever and weight to accomplish faster closing and to minimize slamming effect. Bosses shall be provided on check valves which may be tapped for draining or used for by-pass. The inside and outside of all valves together with the working parts, except bronze and machined surfaces, shall be coated in accordance with AWWA C-550. Marking shall be in accordance with AWWA C-508 and shall include size, working pressure, and cast arrow to indicate direction of flow, name of manufacturer, and year of manufacture. Check valves shall be Style 159 or 259 as manufactured by M&H Valve Co., or equal.

2.7 VALVE BOXES (FOR BURIED VALVES)

- A. Provide a valve box of the adjustable type of heavy pattern, constructed of cast iron and provided with a 6 inch cast iron cover for each buried valve.
- B. Valve boxes shall be manufactured in North America by Clow Corporation, Tyler/Union Corporation, United States Foundries, or equal.
- C. Valve boxes shall be round, 2-piece, sliding type, cast iron. The upper section of each box shall have a flange on top having sufficient bearing area to prevent settling. The bottom of the lower section shall be belled to enclose the operating nut of the valve. The barrel shall be 5-1/2 inch O.D. minimum.
- D. Boxes shall be of lengths consistent with pipe depths. Boxes shall be adjustable, with a lap of at least 6 inches when in the most extended position.
- E. Slot covers for easy removal.
- F. Covers for valve boxes shall have the word "SEWER" cast in the top.
- G. Coat valve boxes with coal-tar pitch enamel or other approved coating.
- H. Valve boxes shall be suitable for the size valve on which they are used. The length of the lower section shall be adequate for trench adjustment, no top or mid-section adapters.
- I. Provide one tee-handled wrench for every four valves installed, unless additional wrenches are required due to variations in valve bury depth. Wrenches shall be field measured to accommodate the depth of bury and provide waist high operation.

2.8 FINISHES

- A. Surface preparation shall be work of this Section and shall be performed in accordance with Section 09900.
- B. Exterior of valves shall be primed and finish painted in accordance with Section 09900.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine valve interior through the end ports for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks used to prevent disc movement during shipping and handling.
- B. Actuate valve through an open-close and close-open cycle. Examine functionally significant features, such as guides and seats made accessible by such actuation. Following examination, return the valve closure member to the shipping position.
- C. Examine threads on both the valve and the mating pipe for form (i.e., out-or-round or local identification) and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Check gasket material for proper size, material composition suitable for service, and freedom from defects and damage.
- E. Prior to valve installation, examine the piping for cleanliness, freedom from foreign materials, and proper alignment.
- F. Replace defective valves with new valves.

3.2 INSTALLATION

- A. General Applications - Refer to the drawings and piping system specification sections for specific valve applications and arrangements.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves and unions for each fixture and item of equipment arranged to allow equipment removal without system shutdown. Unions are not required on flanged devices.
- D. Install valves in horizontal piping with stem at or above the center of the pipe.
- E. Install valves in a position to allow full stem movement.
- F. Install swing check valves in a horizontal position with hinge pin level.
- G. Valves and actuators shall be installed to be plumb in the vertical direction.

3.3 MECHANICAL JOINTS

- A. Mechanical joints shall be made in accordance with Appendix A of ANSI A21.11/AWWA C111 and the manufacturer's instructions. Thoroughly clean and lubricate the joint surfaces and rubber gasket before assembly. Tighten bolts to the specified torques. Under no conditions shall extension wrenches or an extended handle ratchet wrench be used to secure greater leverage.

3.4 THREADED CONNECTIONS

- A. Note the internal length of threads in valve ends and proximity of valve internal seat or wall to determine how far pipe should be threaded into valve.
- B. Align threads at point of assembly.

- C. Apply appropriate tape or thread compound to the external pipe threads (except where dry seal threading is specified).
- D. Assemble joint, wrench tight. Wrench on valve shall be on the valve end into which the pipe is being threaded.

3.5 FLANGED CONNECTIONS

- A. Align flange surfaces parallel.
- B. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly with a torque wrench.

3.6 FIELD QUALITY CONTROL

- A. After piping systems have been tested and put into service, but before final adjusting and balancing, inspect valves for leaks. Adjust or replace packing to stop leaks; replace valves if leak persists.

3.7 CLEANING

- A. Clean mill scale, grease, and protective coatings from exterior of valves and prepare valves to receive finish painting or insulation.

3.8 FINAL ACCEPTANCE AND WARRANTY

- A. Final acceptance of all equipment furnished under these Specifications will be withheld until after the installation and field testing by the Engineer. The manufacturer and the Contractor shall guarantee the equipment against defects of any kind for a period of one year after final testing and acceptance.

END OF SECTION

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2. Where lettering larger than 1 inch height is needed for proper identification, because of distance from normal location of required identification, stenciled signs may be provided in lieu of engraved plastic, at Installer's option.
3. Minimum ¼ inch high lettering for name of unit where viewing distance is less than 2 feet, ½ inch high for distances up to 6 feet and proportionately larger lettering for greater distances. Provide secondary lettering of 67% to 75% of size of the principal lettering.
4. In addition to name of identified unit, provide lettering to distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.
5. At Installer's option, where equipment to be identified is concealed, plasticized tags may be installed within concealed space to reduce amount of text in exposed sign (outside concealment).
 - a. Operational valves and similar minor equipment items located in non-occupied spaces (including machine rooms) may, at Installer's option, be identified by installation of plasticized tags in lieu of engraved plastic signs.

3.2 ADJUSTING

- A. Relocate any mechanical identification device which has become visually blocked by work of this division or other divisions.

3.3 CLEANING

- A. Clean face of identification devices.

END OF SECTION

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SECTION 15120**PIPING SPECIALTIES****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes
 - 1. Bird and Insect Screens
 - 2. Quick Connect Couplings
- B. Related Sections
 - 1. Section 15050 - Piping - General
 - 2. Section 15110 - Valves

1.2 SUBMITTALS

- A. Product data including body material, design, pressure and temperature classification, end connection details, seating materials, trim material and arrangement, dimensions and required clearances, and installation instructions.

PART 2 PRODUCTS**2.1 BIRD AND INSERT SCREENS**

- A. Vents and overflows to exterior shall have stainless steel or PVC corrosion resistant mesh screens permanently affixed to the outlets.

2.2 QUICK CONNECT COUPLINGS

- A. Quick Connect Couplings shall be of the cam and groove type consisting of a male adapter conforming to Specification MIL-C-27487. Male adapters shall be designed to receive a female coupler without requiring threading, bolting, or tools. Connections shall remain tight and leakproof under pressures up to 100 psig. Each adapter shall be furnished with a dust cap complete with an 18 inch long security chain of corrosion resistant material. Couplings shall be of glass reinforced polypropylene with stainless steel pins and rings.

PART 3 EXECUTION**3.1 EXAMINATION AND INSTALLATION**

- A. Comply with Section 15050 and 15110 for examination and installation of valves and piping specialties.

3.2 FIELD QUALITY CONTROL

- A. After piping systems have been tested and put into service, but before final adjusting and balancing, inspect connections for leaks. Adjust or replace as required to correct leaks.

3.3 CLEANING

A. Clean mill scale, grease, and protective coatings from exterior of piping specialties.

END OF SECTION

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SECTION 15125**METERS AND GAUGES****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes
 - 1. Pressure gauges and fittings
- B. Related Sections
 - 1. Section 15050 - Piping - General

1.2 SUBMITTALS

- A. Product data for each type of meter and gauge. Include scale range, ratings, and calibrated performance curves, certified where indicated. Submit meter and gauge schedule showing manufacturer's figure number, scale range, location, and accessories for each meter and gauge.
- B. Product certificates signed by manufacturers of meters and gauges certifying accuracy's under specified operating conditions and products' compliance with specific requirements.
- C. Maintenance data for each type of meter and gauge for inclusion in Operation and Maintenance Manuals.

1.3 QUALITY ASSURANCE

- A. UL Compliance - Comply with applicable UL standards pertaining to meters and gauges.
- B. ASME and ISA Compliances - Comply with applicable portions of ASME and Instrument Society of America (ISA) standards pertaining to construction and installation of meters and gauges.

PART 2 PRODUCTS**2.1 MANUFACTURERS**

- A. Manufacturers - Provide products by one of the following or an approved equal:
 - 1. Pressure Gauges and Accessories
 - a. Wika
 - b. Ametek, U.S. Gauge Div.
 - c. Ashcroft Dresser Industries Instrument Div.
 - d. Trerice (H.O.) Co.
 - e. Weksler Instruments
 - f. Or equal

2.2 PRESSURE GAUGES

- A. Pressure gauges shall be provided where shown on the Drawings, specified in the detailed specifications or required for a complete installation.
- B. Gauges shall be mounted on the discharge of each pump on a section of pipe where the cross-section of pipe is constant and straight, five to ten pipe diameters downstream from any elbow, valve or other similar turn or obstruction that might cause turbulence at the gauge tapping section.
- C. The gauge tap shall be ½ inch NPT and shall be free from burrs or other irregularities.
- D. Pressure gauges shall be a 4½ inch diameter minimum, black FRP (fiberglass reinforced polypropylene) case, glycerin filled, acrylic lens, screwed lens ring, solid front, blow-out back, bronze bourdon tube, ½ inch NPT brass socket, bottom connection, stainless steel brushed movement, 1 % accuracy full scale ANSI B 40.1 grade 1A.
- E. Select the proper vacuum, compound, or pressure range for the service intended. Pressure ranges shall be approximately twice the normal working pressure. Pressure ranges shall be graduated in PSI, vacuum ranges in inches of mercury, pressure gauges for all pumps shall be graduated in both PSI and feet of water.
- F. Pressure gauges shall be provided with an external ½ inch NPT brass snubber to reduce the pressure pulsations to the gauge and a ½ inch NPT brass shut off ball valve.
- G. Provide a diaphragm protection seal, to the gauge and snubber to prevent the media to be measured from clogging or corroding the bourdon tube of the pressure gauge. Diaphragm protection seal shall be of the cleanout design type which will allow cleaning of the lower diaphragm assembly chamber without loss of the fill fluid between the gauge and seal and shall not require refilling or recalibration. The upper housing shall be plated steel. The diaphragm element shall not be less than 2 inches in diameter and shall be made of solid teflon, the lower housing shall be suitable of the service intended and shall have a ½ inch NPT process connection. Pressure gauges and snubbers that are assembled to diaphragm seals shall be filled with 50 cSt silicone fill between the gauge and seal. All gauges and seal assemblies shall be tested and calibrated to ensure proper operation.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Gauges – Install gauges for piping systems at proper angle for best visibility.
- B. Piping installation requirements are specified in other sections of Division 15. The drawings indicate the general arrangement of piping, fittings, and specialties. The following are specific connection requirements:

3.2 CLEANING

- A. Clean windows of meters and gauges and factory finished surfaces. Replace cracked and broken windows, and repair scratched and marred surfaces with manufacturer's touch-up paint.

END OF SECTION

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SECTION 16050**BASIC ELECTRICAL REQUIREMENTS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes
 - 1. Basic Electrical Requirements specifically applicable to Division 16 Sections
 - 2. As-Built Documentation
- B. Related Sections
 - 1. Section 01770 - Closeout Procedures
 - 2. Section 16080 - Electrical Testing

1.2 REFERENCES

- A. ASCE 7-10 – Minimum Design Loads for Buildings and Other Structures
- B. International Building Code – IBC 2018
- C. 2020 Energy Conservation Code of New York State
- D. 2020 New York State Building Code
- E. NFPA 70 - National Electrical Code 2017
- F. NFPA 79 – Electrical Standard for Industrial Machinery
- G. ANSI/ISA-S5.4 – Instrument Loop Diagrams

1.3 SUBMITTALS

- A. Submit shop drawings, product data, and reports.
- B. Submit as-built documentation in accordance with Section 01770. I&C documentation shall conform to the latest versions of NFPA 79 and ANSI/ISA-S5.4.
- C. Submit a written warranty.
- D. Seismic restraint details including stamped certification from a professional engineer.
- E. Provide a schedule of all Electrical system related Owner training, within one month of the Notice to Proceed. Prior to training, resubmit schedule if training is rescheduled and resubmit upon completion of all training. At a minimum, for each piece of equipment or system to be demonstrated, the schedule should include the following:
 - 1. Equipment or system to be demonstrated
 - 2. Related specification section
 - 3. Anticipated date of training

4. Anticipated duration of training session
5. Name and company of instructor providing the training
6. Date completed
7. Actual duration of training session

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable New York State Building Code.
- B. Electrical - Conform to National Electrical Code with Chapter 27 of the 2020 New York State Building Code.
- C. Conform to applicable Local Building Codes.
- D. Obtain and pay for all applicable permits.
- E. Schedule and pay for all inspections necessary for the electrical installation including but not necessarily limited to the general electrical inspection and fire department inspections.

1.5 PROJECT CONDITIONS

- A. Install Work in locations shown on Drawings, unless prevented by Project conditions.
- B. Prepare drawings showing proposed rearrangement of Work to meet Project conditions, including changes to Work specified in other Sections. Obtain permission from the Engineer before proceeding.
- C. Location of electrical equipment, devices, and similar items, as indicated, are approximate only. Exact locations are to be determined by the Contractor during construction. If any location is different from those indicated (greater than 5 feet away from location shown on Drawings), the Engineer must give approval to the change.
- D. Verify in field, existing conditions and final locations of equipment installed under other Sections that require electrical work.
- E. Where it is necessary to core a hole through an existing concrete slab or wall, the Contractor shall conduct a survey with a pachometer or by similar means to identify the location of steel reinforcing bars. The new hole shall be located so as to avoid cutting reinforcing bars. Where reinforcing steel is close enough together that it is not possible to core the required hole without cutting reinforcing bars, contact the Engineer for further direction before cutting a hole. Where reinforcing bars are cut without the consent of the Engineer, the slab or wall will be repaired at the expense of the Contractor.
- F. Equipment wiring
 1. Equipment power and control wiring is based on specific manufacturers and models. Actual wiring required may be different.
 2. Before pulling any power or control wire or installing conduit, obtain equipment electrical and control installation instructions and wiring diagrams. Any discrepancies from what is shown on the electrical drawings shall be brought to

the attention of the Engineer. The Engineer will provide instructions for any changes that may be necessary.

3. Installation of conduit or wire prior to obtaining the above specified information shall be at the Contractor's risk. The Owner will not be responsible for any extra costs related to removal or replacement of conduit or wire resulting from the failure to coordinate equipment conduit and wire requirements. In the event that additional conductors or larger conductors than shown on the Drawings are required, the Owner will not be responsible for any labor costs related to the installation of these materials unless it can be demonstrated by the Contractor to the satisfaction of the Engineer that these conductors could not have been installed at the same time as the conductors shown on the Drawings.
4. Provide wiring shown on the Drawings unless specifically excluded.

G. Drawings and Specifications

1. Drawings and Specifications are typical of work done and of arrangement desired. Provide accessories and appurtenances necessary for complete installation (e.g., home runs, conduit and wire for instrumentation and control wiring) that are required to provide a complete electrical system.
- H. As-Built Drawings: Maintain a master set of as-built drawings showing the changes and deviations from the Drawings or the approved shop drawings. Make markups as the changes are made.
- I. Where underground electric facilities are installed, measure, record, and submit as built dimensions.

1.6 WARRANTY

- A. Submit a written warranty, executed by the Contractor and manufacturer agreeing to the replacement and installation of all material, parts and adjustments required due to failure in materials or workmanship within one year from final acceptance of the Work.
- B. This warranty shall be in addition to, and not a limitation of, other rights and remedies the Owner may have against any party under the Contract Documents. This warranty is in addition to all other warranties existing under either the Contract Documents or required by Law.

1.7 SEISMIC REQUIREMENTS

- A. Components, systems and their supports shall be designed by the contractor in accordance ASCE 7-10, Section 13.6 Mechanical and Electrical Components, the International Building Code (IBC 2015), and Chapter 16 of the New York State Building Code.
- B. Submit details showing the seismic restraints.
- A. Submit stamped, signed certification from a State of New York licensed professional structural engineer that the design meets the seismic restraint requirements.

PART 2 PRODUCTS

2.1 GENERAL

- A. Products shall be Underwriter's Laboratory (UL) listed if a UL listing for that product is available.
- B. Equipment Ampere Interrupting Capacity (AIC) and/or Short Circuit Current Rating (SCCR): Electrical equipment shall be labeled in accordance with NFPA 70 and have an Ampere Interrupting Capacity rating or Short Circuit Current Rating of equal to or greater than the following:
 - 1. 480 volt equipment: 35,000 amps
 - 2. 208 or 240 volt equipment: 10,000 amps

2.2 FINAL SYSTEM DOCUMENTATION

- A. Prior to final acceptance of the system, provide operating and maintenance manuals (O&M's) covering instruction and maintenance on each type of equipment in accordance with Section 01770.
- B. The requirements for final documentation shall be as specified in Section 01770.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Perform all work in accordance with OSHA (Occupational Safety and Health Administration) requirements.
- B. Perform all work in accordance with NFPA 70E, Handbook for Electrical Safety in the Workplace.
- C. Install all equipment in accordance with manufacturer's instructions and recommendations.
- D. Test all electrical components in accordance with Section 16080 and as indicated in individual electrical equipment specification sections.
- E. Perform all electrical equipment installation, checkout, and test in a safe manner. Provide the following special safety precautions, as appropriate:
 - 1. Locking and tagging procedures
 - 2. Barricades
 - 3. De-energization and/or isolation of equipment prior to testing
 - 4. Review of procedures with the Engineer and the Owner
 - 5. Erection of warning signs
 - 6. Stationing of guards and watchmen
 - 7. Maintenance of voice communications
 - 8. Personnel orientation

- F. Do not install electrical equipment in its permanent location until structures are weather-tight or equipment is properly protected from the weather.
- G. Before energizing any machine, visually inspect for serviceability. Verify that equipment and machines have been properly lubricated and aligned. Verify nameplate for electrical power requirements.

END OF SECTION

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SECTION 16060**GROUNDING AND BONDING****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes
 - 1. Power system grounding
 - 2. Electrical equipment and raceway grounding and bonding
 - 3. Grounding of piping and other conductive equipment
 - 4. Grounding electrode system three-point test (to be performed by a third-party NETA-certified testing company)
- B. Related Sections
 - 1. Section 16080 – Electrical Testing

1.2 REFERENCES

- A. NFPA 70 – National Electrical Code
- B. UL 467 - Grounding and Bonding Equipment
- C. UL 486A – Wire Connectors and Soldering Lugs for Use with Copper Conductors
- D. UL 1059 – Terminal Blocks
- E. IEEE/ANSI 142 – Latest Edition Recommended Practice for Grounding of Industrial and Commercial Power Systems.
- F. ASTM B3 - Solid Conductors
- G. ASTM B8 – Assembly of Stranded Conductors
- H. ASTM B33 – Tined Conductors
- I. NEMA GR1 – Ground Rods and Ground Rod Couplings

1.3 SYSTEM DESCRIPTION

- A. Ground the electrical service system neutral and ground bus at the utility service entrance equipment to grounding electrodes. Grounding electrode system shall include a minimum of three driven ground rods, the underground water service pipe, rebar and ground ring around generator pad. For new construction, the grounding electrode system shall include the rebar in accordance with NEC 250.52(A)(3).
- B. Ground each separately derived system neutral to the nearest grounding electrode other than a water pipe.
- C. Bond together exposed non-current carrying metal parts of electrical equipment, metal raceway systems, grounding conductor in raceways and cables, receptacle ground connectors and all metallic piping.

- D. Install grounding in accordance with NEC Article 250.

1.4 SUBMITTALS

- A. Submit shop drawings, product data, and reports.
- B. Indicate layout of ground rods, location of system grounding electrode connections, and routing of grounding electrode conductor.
- C. Submit ground resistance testing reports in accordance with Section 16080.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Grounding Electrode Conductors
 - 1. Type: Medium-hard drawn bare copper
 - 2. Manufacturer
 - a. Okonite Co.
 - b. Rome Cable Corp.
 - c. American Insulated Wire Corp.
 - d. Southwire
 - e. or equal
- B. Grounding Conductors - insulated copper, minimum size #12 AWG and in accordance with NEC Tables 250.66, 250.102(C)(1) and 250.122, or larger if so indicated on the Drawings
- C. Ground Rods: Copper-clad steel, $\frac{3}{4}$ inch diameter, minimum length 10 feet
- D. Connectors - Compression
 - 1. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used and specific types, sizes and combination of conductors and items connected.
 - 2. Irreversible compression connectors that meet or exceed the performance requirements of IEEE837, UL467 latest revisions. Compression connectors shall be listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and specific types, sizes and combinations of conductors and other items connected.
 - 3. The irreversible compression connectors shall be manufactured of from pure wrought copper.
 - a. The installation of the connectors shall be made with a hydraulic compression tool and die system clearly showing embossed die stamp on each crimp as recommended by the manufacturer of the connectors
 - b. The connectors shall be clearly marked with the manufacturer, catalog number, conductor size

- c. Each connector shall be factory filled with an oxide – inhibiting compound where applicable.
- 4. Manufacturer
 - a. ABB Blackburn Installation Products
 - b. Burndy
 - c. IlSCO
 - d. Or equal
- E. Connectors - Welded
 - 1. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used and specific types, sizes and combination of conductors and items connected.
 - 2. Exothermic welded connections for copper to copper and copper to steel connections to ground rods, ground buses, ground wires, steel beams etc.
 - 3. Conductors spliced with exothermic welded connections shall be considered as a continuous conductor, as stated in the noted accompanying NEC Article 250.50, 250.64 and IEEE Standard 80 latest edition.
 - a. Procedures outlined in the manufacturer's installation instructions shall be followed. Molds shall not be modified during installation in field applications
 - b. Weld metals shall be a mixture of copper oxide and aluminum. Only one weld metal mixture shall be required for each grounding connection.
 - c. Grounding connections shall be tested and certified in accordance with IEEE837, UL487A and UL 467.
 - d. Manufacturer
 - 1) ABB Furseweld Installation Products
 - 2) Burndy Thermoweld
 - 3) Erico Cadweld
 - 4) Or equal

PART 3 EXECUTION

3.1 INSTALLATION

- A. Provide a separate, insulated equipment grounding conductor with each feeder and branch circuit. Terminate each end on a grounding lug, bus, or bushing.
- B. Use a minimum of #8 AWG copper wire to ground all piping and other conductive equipment or structures.
- C. Use grounding bushings on all conduits stubbed up below equipment, panelboards, switchboards and motor control centers. Bond all conduits to ground bus. Use

grounding bushings to ground electrical equipment and exposed non-current carrying metal parts.

- D. Use exothermic weld type ground connections for the grounding electrode system: cable to cable, cable to ground rod and cable to building structural steel and reinforcing steel connections.
- E. Supplementary Grounding Electrode: Use effectively grounded metal frame and rebar of the building and ground rods spaced a minimum of 10 feet apart in sufficient quantity to have a measured resistance to ground of not more than 5 ohms.
- F. Use minimum #6 AWG copper conductor for communications service grounding conductor. Leave 10' slack conductor at terminal board.
- G. Drive ground rods one foot below finished grade.
- H. Ground the water pipe as required by NEC Article 250. Provide a grounding jumper over the water meter as required. Provide a grounding jumper over all meters installed on incoming metallic piping for utility equipment.

3.2 FIELD QUALITY CONTROL

- A. Inspect grounding and bonding system conductors and connections for tightness and proper installation and compliance with NEC Article 250.

3.3 TESTING

- A. Perform ground tests using a low resistance, Null balance type, ground testing ohmmeter, with test lead resistance compensated for. Use the type of test instrument which compensates for potential and current rod resistances.
- B. Test the grounding electrode system using a fall of potential three-point test and measure ground resistance. This test shall be performed by a third-party NETA-certified testing company. Submit tabulation of results to the Engineer. Include identification of electrodes, date of reading and ground resistance value in the test reports. If the resistance is not 5 ohms or less, contact the Engineer. The Engineer will initiate design changes, if necessary, to obtain acceptable values of ground resistance.
- C. Ground resistance of conduits, equipment cases, and supporting frames, shall not vary from that of system as a whole and shall not exceed 0.5 ohms to ground. Measure resistance to ground of representative items, as directed by the Engineer. Submit all readings to the Engineer.

END OF SECTION

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SECTION 16070**ELECTRICAL HANGERS AND SUPPORTS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes
 - 1. Support channel
 - 2. Fastening hardware
 - 3. Anchor bolts

1.2 REFERENCES

- A. ASTM A-780 – Standard Practice for Repair of Damaged and Uncoated Areas of Hot Dipped Galvanized Coatings

1.3 SUBMITTALS

- A. Submit shop drawings, product data, and reports.

1.4 QUALITY ASSURANCE

- A. Support systems shall be adequate for weight of equipment and conduit, including wiring, which they carry.

PART 2 PRODUCTS**2.1 SUPPORT CHANNEL**

- A. Support channel shall be stainless steel outdoors and hot dipped galvanized steel elsewhere unless noted otherwise.
- B. Support channel assembly hardware shall be stainless steel.
- C. In wet locations, support channel components in contact with the concrete shall be stainless steel.
- D. Manufacturer:
 - 1. Unistrut
 - 2. B-Line
 - 3. ABB Super Strut Installation Products
 - 4. Or equal

2.2 FASTENING HARDWARE

- A. All fastening hardware shall be 304-stainless steel unless noted otherwise.

2.3 ANCHOR BOLTS

- A. Anchor bolts shall be suitable for cracked or uncracked concrete and CMU construction.
- B. Anchor bolts, nuts, washers, bolt sleeves, and assembly hardware shall be Type 316 stainless steel.
- C. Use expansion anchors or preset inserts in solid masonry walls; self-drilling anchors or expansion anchor on concrete surfaces.
- D. Manufacturer:
 - 1. Hilti, Kwik-Bolt TZ SS 316
 - 2. Powers Fasteners, Power-Stud+ SD6
 - 3. Simpson Strong-Tie, Strong-Bolt 2
 - 4. Or Equal

2.4 PIPE CLAMPS AND STANDOFFS

- A. Pipe clamps and standoffs shall be one hole, galvanized malleable iron type. They shall be of the same manufacturer and shall be designed to be used together.
- B. Strut pipe clamps shall be 2-piece type galvanized steel.
- C. The finish shall be suitable for the piping system being supported.

2.5 THREADED RODS

- A. Threaded hanging rods shall be 304 stainless steel and be one piece. The size shall be suitable for the loads being supported.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building structure using expansion anchors, preset inserts or beam clamps. Do not use spring steel clips and clamps.
- B. Do not fasten supports to piping, ductwork, mechanical equipment, or conduit.
- C. Do not use powder-actuated anchors.
- D. Hanger rods shall be subjected to tension only. Lateral and axial movements shall be accommodated by proper linkage in the rod assembly.
- E. Fabricate supports from support channel rigidly welded or bolted to present a neat appearance. Galvanized structural steel may be used where galvanized support channel is allowed. Use stainless steel hexagon head bolts with spring lock washers under all nuts. Coat ends of galvanized steel channel that has been cut with zinc-rich paint in accordance with ASTM A-780.
- F. Install surface-mounted cabinets and panelboards with minimum of four 316 stainless steel anchors. Provide channel supports to stand cabinet 1 inch off wall.

- G. Use standoffs for all surface mounted conduit to maintain $\frac{1}{4}$ inch space between conduits and walls.

END OF SECTION

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SECTION 16075**ELECTRICAL IDENTIFICATION****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes
 - 1. Nameplates
 - 2. Wire and cable markers

1.2 REFERENCES

- A. NEMA WC5 - Thermoplastics - Insulated Wire and Cable for Transmission and Distribution of Electrical Energy
- B. ANSI C57

1.3 SUBMITTALS

- A. Provide schedule for nameplates.

PART 2 PRODUCTS**2.1 NAMEPLATES**

- A. Engraved two-layer plastic, white letters on a black background
- B. Nameplate Wording:
 - 1. Wording of the nameplates shall be in conformance with Drawings and acceptable to the Owner.
 - 2. Wording of the nameplates for each piece of equipment shall be based on the common name and tag number (when applicable) of the equipment.

2.2 WIRE AND CABLE MARKERS

- A. Wires up to AWG10: Split sleeve or tubing type waterproof markers (Thomas & Betts, Panduit, Burndy or equal).
- B. Wires AWG8 and larger: Plastic impregnated cloth markers, resistant to abrasion, moisture, dirt and oil (Ideal, Panduit, Brady or equal).

PART 3 EXECUTION**3.1 INSTALLATION**

- A. Degrease and clean surfaces to receive nameplates.
- B. Install nameplates parallel to equipment lines.
- C. Secure nameplates to equipment fronts using ASA Type U drive screws, and water-resistant adhesive. Secure nameplate to face of panelboard doors one third of the way down from the top of the door. Embossed tape will not be permitted for any application.

3.2 WIRE IDENTIFICATION

- A. Provide wire markers on each end of each conductor in panelboard gutters, pull boxes, outlet and junction boxes, switchgear, switchboards, motor control centers, control panels, at each load connection and at each terminal board connection. Identify wiring as following:
 - 1. Power and lighting circuit wires: Wire markers shall identify (a) power source/panelboard name and circuit ID number (e.g. "LP-1,2,3"), and (b) load/equipment name (e.g. "VFD 1").
 - 2. Control & signal wiring: The identification on wire markers shall match the ID tag number of the wire/terminal shown on the associated equipment shop drawings.
- B. Circuits passing through junction boxes shall be individually grouped and bound with Ty-raps.
- C. Include the following color coding of all conductors used for power or lighting circuits.
 - 1. 120/208 volt, three phase 4 wire
 - a. Black - Phase A
 - b. Red - Phase B
 - c. Blue - Phase C
 - d. White - Neutral
 - e. Green - Equipment ground
 - 2. 277/480 volt 3 phase 4 wire
 - a. Brown - Phase A
 - b. Orange - Phase B
 - c. Yellow - Phase C
 - d. Gray - Neutral
 - e. Green - Equipment ground
- D. Color coding of multiconductor control cables shall be in accordance with NEMA Standard WC5.

3.3 NAMEPLATE ENGRAVING SCHEDULE

- A. Provide nameplates of minimum letter height as scheduled below.
- B. Panelboards - ¼ inch to identify equipment designation, 1/8 inch to identify voltage rating and source.
- C. Switches in Panelboards - ¼ inch to identify circuit and load served, including location.

- D. Motor Starters in Control Panels - ¼ inch to identify circuit and load served, including location.
- E. Individual Circuit Breakers, Enclosed Switches, Remote Operator Stations, Time Clocks, Control Devices, and Motor Starters – 1/8 inch to identify load served.
- F. Transformers - ¼ inch to identify equipment designation, 1/8 inch to identify primary and secondary voltages, primary source, and secondary load and location. Power transformer nameplates shall be in accordance with ANSI C57.
- G. Pumps, fans, and other electrical equipment - ¼ inch to identify equipment designation.

END OF SECTION

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SECTION 16080
ELECTRICAL TESTING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Testing of Electrical Systems - General
 - 2. Electrical Test Equipment
 - 3. Electrical Test Procedures
 - 4. Specific Electrical Tests
 - 5. System Function Tests
- B. Related Sections
 - 1. Section 16060 – Grounding and Bonding
 - 2. Section 16075 – Electrical Identification

1.2 REFERENCES

- A. New York State Building Code
- B. NFPA 79 – Electrical Standard for Industrial Machinery
- C. ANSI/ISA-S5.4 – Instrument Loop Diagrams
- D. ANSI C37

1.3 SUBMITTALS

- A. General: Testing shall be performed, with satisfactory results, prior to connecting and energizing equipment. Problems discovered as a result of testing shall be corrected and retesting performed prior to connecting and energizing equipment.
- B. The following test reports shall be submitted
 - 1. Motor test results
 - 2. Megger test results
 - 3. Wire and cable continuity test results
 - 4. Grounding system test results
 - 5. System functional test reports

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION**3.1 TESTING OF ELECTRICAL SYSTEMS - GENERAL**

- A. Provide supervision, labor, materials, tools, test instruments and other equipment or services and expenses required to test, adjust, set, calibrate, and operationally check work and components of the various electrical and control systems and circuitry throughout the contract.
- B. Pay for all tests specified in Division 16, including expenses incident to re-tests occasioned by defects and failures of equipment to meet specifications. Unless otherwise specified, the Owner will supply the electric current necessary for tests.
- C. After completion of testing replace wiring and equipment found defective (defined as failing to meet specified requirements).
- D. Do not void equipment warranties or guarantees by testing and checkout work. Checks and tests shall be supplemental to and compatible with the manufacturer's installation instructions. Where deviations are apparent, obtain the manufacturer's approved review of procedure prior to testing. Where any repairs, modifications, adjustments, tests or checks are to be made, contact the Engineer to determine if the work should be performed by or with the manufacturer's representative. All checks and tests specified for proper operating and safety of equipment and personnel are to be performed concurrent with progression of the work, prior to final acceptance by the Owner.
- E. At any stage of construction and when observed, any electrical equipment or system determined to be damaged, or faulty, is to be reported to the Engineer. Corrective action requires Engineer's approval prior to re-testing, and inspection.
- F. Prior to testing and start-up, equipment and wiring shall be properly and permanently identified with nameplates, and other identification as specified in Section 16075. Check and tighten terminals and connection points, remove shipping blocks and thoroughly clean equipment, repair damaged or scratched finishes, inspect for broken and missing parts and review and collect manufacturer's drawings and instructions for delivery to the Engineer. Make routine checks and tests as the job progresses to ensure that wiring and equipment is properly installed.
- G. Testing and checkout work is to be performed with fully qualified personnel skilled in the particular tests being conducted. Personnel are to have at least 5 years of experience with tests of same type and size as specified.
- H. Conduct tests in presence of the Engineer. Notification is required 7 calendar days or more in advance when any test is to be performed, and do not start tests without approval.
- I. Make openings in circuits for test instruments and place and connect instruments, equipment, and devices, required for the tests. Upon completion of tests, remove instruments and instrument connections and restore circuits to permanent conditions.
- J. Identify test being performed, conductor or equipment the test is being performed on, date the test was performed, value of test results, person performing the test, the witness to the test, and the serial and model number and description of test instrument. Arrange information in tabular form and submit to the Engineer for approval.

- K. When the electrical tests and inspections specified or required within Division 16 are complete and results reported, reviewed, and approved, that portion of the electrical equipment system or installation may be considered electrically complete. Affix appropriate, approved, and dated completion or calibration labels to the tested equipment and notify the Engineer of electrical completion. If the Engineer finds completed work unacceptable, he will notify the Contractor in writing of unfinished or deficient work, with the reason for his rejection, to be corrected by the Contractor. The Contractor will notify the Engineer in writing when exceptions have been corrected. The Contractor will prepare a "notification of Substantial Electrical Completion" for approval by the Engineer following the Engineer's acceptance of electrical completion. If later in-service operation or further testing identifies problems attributable to the Contractor, these will be corrected.

3.2 ELECTRICAL TEST EQUIPMENT

- A. Test equipment used is to be inspected and calibrated.
- B. Perform calibration and setting checks with calibrated test instruments of at least twice that of the accuracy of the equipment, device, relay or meter under test. Dated calibration labels shall be visible on test equipment. Calibrations over 6 months old are not acceptable on field test instruments. Inspect test instruments for proper operation prior to proceeding with the tests.
- C. Perform ground tests using a low resistance, Null balance type, ground testing ohmmeter, with test lead resistance compensated for. Use the type of test instrument which compensates for potential and current rod resistances.

3.3 TEST PROCEDURES

- A. Prepare procedures and schedules for the work specified herein. This work is to be coordinated and compatible with both the work and schedule of the other crafts. Sequence the tests and checks so that the equipment can be energized immediately after the completion of the application tests.
- B. The test procedures shall provide specific instructions for the checking and testing of each electrical component of each system. Schedule tests and inspections as the job progresses.
- C. Testing and checkout work shall be conducted in a safe manner. Provide the following special safety precautions, as appropriate:
1. Locking and tagging procedures
 2. Barricades
 3. Deenergization and/or isolation of equipment prior to testing
 4. Review of procedures with the Engineer and Resident Project Representative
 5. Erection of warning signs
 6. Stationing of guards and watchmen
 7. Maintenance of voice communications
 8. Personnel orientation

- D. Before energizing any machine, visually inspect for serviceability. Check manufacturer's instruction manual for correct lubrication and ventilation. Align motor with driven equipment. Check nameplate for electrical power requirements.
- E. Insulation resistance measurements for motor feeders shall be performed with motors disconnected, measure insulation resistance from load side of contactors or circuit breakers.
- F. Perform insulation tests at the following times and conditions:
 - 1. Prior to energization and/or placing into service.
 - 2. When damage to the insulation is suspected or known to exist.
 - 3. After repairs or modifications to the equipment affecting the insulation.
 - 4. Where lightning or other surge conditions are known to have existed on the circuit.
- G. Where ground test results identify the need for additional grounding conductors or rods that are not indicated or specified, design changes will be initiated to obtain the acceptable values.

3.4 SPECIFIC ELECTRICAL TESTS

- A. Motors
 - 1. Perform insulation tests on motor windings and record results.
 - 2. Test run motors 1 HP and above uncoupled or unloaded, before placing into operation. Check the motor for rotation, speed, current and temperature rise under normal load and record the results.
- B. Wire and Cable
 - 1. For all 480 volt circuits, megger test the insulation of every external circuit wire to each other and to ground. Tests shall be conducted at voltages of 1,000 V DC and record results.
 - 2. Continuity test each control and/or low voltage (below 480 volts) wire and cable to verify the field applied tag per conductor and record results.
- C. Perform insulation tests on electrical equipment, apparatus, generators, transformers, power circuit breakers and switches, and similar electrical equipment.
- D. Relay Panels, Operator and Instrument Control Panels, Programmable Controllers, Micro-Processors, Battery Systems and Other Miscellaneous Equipment
 - 1. Upon completion of equipment installation, visually and functionally test equipment and their control devices for tightness of connections and for proper operation. In the case of battery systems, static inverters and similar equipment, follow manufacturer's recommended test and installation manuals upon review and approval by the Engineer. In the case of operator, instrument, and relay panels and cabinets or devices used solely for control, functionally test each circuit for proper operation and compliance with the Drawings and Specifications. Where functional testing is deemed undesirable by the Engineer

from a safety or plant operational standpoint, then continuity and terminal connection verification checks will be acceptable.

E. Grounding Systems

1. Test in accordance with Section 16060.

3.5 SYSTEM FUNCTION TESTS

- A. It is the purpose of system function tests to prove the correct operation of systems/equipment and correct interaction of all sensing, processing, and action devices.
- B. Perform system function tests upon completion of the maintenance tests defined, as system conditions allow. Document results and submit a detailed report for all functional tests.
 1. Develop test parameters and perform tests for the purpose of evaluating performance of all integral components and their functioning as a complete unit within design requirements and manufacturer's published data.
 2. Verify the correct operation of all interlock safety devices for fail-safe functions in addition to design function.
 3. Verify the correct operation of all sensing devices, alarms, and indicating devices.
 4. Function test relay self-test, power supply failure, and trip coil monitor alarms to SCADA system.
 5. Function test bus restoration and/or transfer switches.
 6. Verify correct metering on protective relays and meters.
 7. Verify control circuits and current transfer circuits are restored to normal operation.
 8. Verify communication lines are operational for local and remote devices.
 9. Verify control annunciation systems are left with no alarms and any alarms present shall be investigated.
- C. Verify systems are left in normal operating mode or position, transfer and restoration schemes are enabled, and monitoring and protection devices are operational.

END OF SECTION

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SECTION 16120**CONDUCTORS AND CABLES****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes
 - 1. Building wire and cable
 - 2. Shielded signal cable
 - 3. Ethernet cable
 - 4. Underground telephone cable
 - 5. Wire connectors
- B. Related Sections
 - 1. Section 16075 - Electrical Identification

1.2 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code

1.3 SUBMITTALS

- A. Submit shop drawings, product data and reports.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years documented experience.

1.5 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions. Determine required separation between cable and other work.
- C. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required. Determine cable routing to avoid interference with other work.

PART 2 PRODUCTS**2.1 BUILDING WIRE AND CABLE**

- A. Description: Stranded conductor insulated wire, multi-conductor control cable and tray cable.
- B. Conductor: copper
- C. Insulation Voltage Rating: 600 volts

- D. Insulation: ANSI/NFPA 70; Type THW, 75°C insulation, XHHW-2 insulation for underground power wiring AWG 8 and larger; type THHN/THWN insulation for aboveground feeders and branch circuits, and underground power wiring AWG 10 and smaller. Type THHN/THWN insulation for AWG 14 control wire.
- E. Manufacturer
 - 1. Okonite Co.
 - 2. Rome Cable Corp.
 - 3. American Insulated Wire Corp.
 - 4. Southwire
 - 5. or equal

2.2 SHIELDED SIGNAL CABLE

- A. Description: twisted pair shielded instrumentation wire, NEC type TC listed, wet location, approved for Class 1 circuits as permitted in NEC Article 725.
- B. Conductor: tinned copper 18 AWG
- C. Insulation Material: PVC with a nylon overcoat
- D. Insulation Temperature Rating: 75°C wet, 90°C dry
- E. Shield: 100% coverage, with drain wire
- F. Jacket: 90°C PVC
- G. Insulation voltage rating: 600 volts
- H. Manufacturer
 - 1. Belden No. 9341
 - 2. Approved equal by Alpha
 - 3. Approved equal by Clifford
 - 4. or equal

2.3 SHIELDED 3-CONDUCTOR CABLE

- A. Description: Three-conductor shielded instrumentation cable, NEC type TC listed, wet location, approved for Class 1 circuits as permitted in NEC Article 725.
- B. Conductor: Tinned copper 18 AWG
- C. Insulation Material: PVC with nylon overcoat
- D. Insulation Temperature Rating: 75°C wet, 90°C dry
- E. Insulation Voltage Rating: 600 volts
- F. Shield: 100% shield coverage, with drain wire
- G. Jacket: 90°C PVC

- H. Manufacturer
 - 1. Belden No. 1121A
 - 2. Approved equal by Alpha
 - 3. Approved equal by Clifford
 - 4. or equal

2.4 ETHERNET CABLE

- A. Description: NEC CMR cable, Category 5E unbonded-pair cable
- B. Construction: 24 AWG solid bare copper, 4 twisted pairs, overall shield, drain wire, RJ-45 compatible, non-plenum, polyolefin insulation, PVC jacket.
- C. Manufacturer
 - 1. Belden 1533R
 - 2. Approved equal by Alpha

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that mechanical work likely to damage wire and cable has been completed.

3.2 PREPARATION

- A. Completely and thoroughly swab raceway before installing wire.

3.3 INSTALLATION

- A. Minimum size for power wiring shall be AWG #12.
- B. Minimum size for control wiring shall be AWG #14.
- C. All wiring shall be run in conduit, unless otherwise noted.
- D. Install products in accordance with manufacturers instructions.
- E. Use stranded conductors for all wire sizes.
- F. In raceways, mechanically complete the installation in all details. Pull all conductors into raceway at same time.
- G. Use suitable wire pulling lubricant for building wire 4 AWG and larger.
- H. Protect exposed cable from damage.
- I. Use suitable cable fittings and connectors.
- J. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- K. Clean conductor surfaces before installing lugs and connectors.

- L. Instrumentation, control and signal wiring shall be continuous with no splices from source to destination, unless otherwise shown on drawings.
- M. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- N. Use split bolt connectors for copper conductor splices and taps, 8 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.
- O. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
- P. Ground signal cable shields on receiving end only.
- Q. Properly connect and insulate shields at all splice points.
- R. Provide Kellems grips for all cord connected devices.
- S. Provide separation of power wiring from control and signal wire in accordance with NEC Article 725.
- T. Install Ethernet cables in accordance with manufacturer's instructions and industry standards for category 5e wiring.

3.4 INTERFACE WITH OTHER PRODUCTS

- A. Identify wire and cable under provisions of Section 16075.
- B. Identify each conductor with its circuit number or other designation indicated on Drawings.

3.5 FIELD QUALITY CONTROL

- A. Inspect wire and cable for physical damage and proper connection.
- B. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.
- C. Verify continuity of each branch circuit conductor.

END OF SECTION

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SECTION 16131**CONDUIT****PART 1 GENERAL****1.1 SUMMARY****A. Section Includes**

1. Galvanized rigid steel conduit
2. Non-metallic (PVC) conduit
3. Fittings and conduit bodies
4. Conduit wall seals
5. Underground warning tape
6. Conduit expansion joint
7. Conduit sealing bushing
8. Cold galvanizing compound

B. Related Sections

1. Section 16060, Grounding and Bonding
2. Section 16070, Electrical Hangers and Supports

1.2 REFERENCES

- A. ACI 318 – Building Code Requirements for Structural Concrete
- B. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies
- C. ANSI/NFPA 70 - National Electric Code
- D. ANSI C80.1 - Galvanized Rigid Steel Conduit, Zinc Coated
- E. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing
- F. UL-6 – Standard for Rigid Metal Conduit
- G. UL-6A – Electrical Rigid Metal Conduit – Aluminum, Red Brass and Stainless Steel

1.3 SUBMITTALS

- A. Shop drawings, product data and reports
- B. Riser Diagrams for the electrical installation

1.4 DESIGN REQUIREMENTS

- A. Conduit Size: ANSI/NFPA 70

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Accept conduit on site. Inspect for damage.
- B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
- C. Protect PVC conduit from sunlight.

1.6 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Verify routing and termination locations of conduit prior to rough-in.
- C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.
- D. Provide complete conduit systems between electrical equipment and devices as required.

PART 2 PRODUCTS

2.1 GENERAL CONDUIT REQUIREMENTS

- A. Minimum Size: 3/4 inch unless otherwise specified
- B. Outdoor locations:
 - 1. Exposed: Use galvanized rigid steel conduit
 - 2. Buried: Use schedule 40 PVC conduit, concrete encased where indicated on the drawings.
- C. Class 1 Division 1 and 2 Hazardous Locations
 - 1. Use galvanized rigid steel conduit
 - 2. Provide sealing fittings at each entrance to enclosure housing an arcing device. Locate seal fittings as close as possible, in no case more than 18 inches.
 - 3. Provide seal fittings for each conduit leaving hazardous (Class 1 Division 1 or 2) area.
 - 4. Use conduit seal fittings appropriate for conduit orientation.
 - 5. Use conduit sealing compound with fiber dam in compliance with manufacturer's recommendations.
 - 6. Provide junction boxes rated for hazardous locations.
- D. All Other Locations:
 - 1. Concealed: Use galvanized rigid steel conduit
 - 2. Exposed: Use galvanized rigid steel conduit
- E. Connections to portable equipment from junction boxes and connections to all motors: use liquid tight flexible metal conduit.
 - 1. Minimum Length: 12 inches

2. Maximum Length: 36 inches

2.2 GALVANIZED RIGID STEEL CONDUIT

- A. Rigid Steel Conduit: ANSI C80.1
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; all steel fittings
- C. Hot dipped galvanized inside and outside with additional passivation coating for extra protection.

2.3 LIQUIDTIGHT FLEXIBLE METAL CONDUIT AND FITTINGS

- A. Description: Interlocked steel construction with PVC jacket
- B. Liquidtight flexible metal conduit and fittings shall be appropriate outer jacket and metallic core for application requirements
- C. Fittings: ANSI/NEMA FB 1. Fittings shall be gasketed. Material shall be zinc-coated in dry locations and galvanized or zinc die cast in wet and damp locations.
- D. Manufacturer
 - 1. ABB Installation Products
 - 2. Anamet
 - 3. Electriflex
 - 4. Or equal

2.4 NONMETALLIC (PVC) CONDUIT

- A. Description: NEMA TC 2; Schedule 40 PVC
- B. Fittings: NEMA TC3

2.5 CONDUIT WALL SEALS

- A. Type - Suitable for core drilled holes
- B. Manufacturer
 - 1. O-Z Gedney, Type CSM
 - 2. Equal by Crouse-Hinds
 - 3. Or equal

2.6 UNDERGROUND WARNING TAPE, DETECTABLE

- A. Warning tape for all buried electrical conduit shall be solid aluminum foil core tape and printed with the words "CAUTION - BURIED ELECTRICAL LINE BELOW."
- B. Tape shall be red and 6 inches wide.
- C. Manufacturers
 - 1. Ideal Industries
 - 2. Cable Accessories
 - 3. E. L. S. Products Corp

4. Or equal

2.7 FITTINGS AND CONDUIT BODIES

A. Fittings

1. Description - Threaded, malleable Iron or copper-free aluminum. Material and coating to correspond with type of conduit system being used, galvanized where galvanized rigid steel conduit is used and PVC-coated where PVC-coated conduit is used.

B. Conduit Bodies

1. Description - Threaded, malleable Iron or copper-free aluminum. Material and coating to correspond with type of conduit system being used, galvanized where galvanized rigid steel conduit is used and PVC-coated where PVC-coated conduit is used.
2. Manufacturer
 - a. Appleton-Type Mogul - malleable iron or copper-free aluminum
 - b. Equal by ABB Installation Products
 - c. Equal by O-Z Gedney
 - d. Equal by Crouse-Hinds
 - e. or equal

C. Conduit Hubs

1. Manufacturer
 - a. Crouse Hinds – Myers hub Type HUB
 - 1) Galvanized steel in damp and wet locations
 - 2) Stainless steel in corrosive locations
 - 3) Zinc coated steel in dry locations
 - b. Equal by O-Z Gedney
 - c. Equal by RACO
 - d. Equal by Appleton
 - e. or equal

2.8 CONDUIT EXPANSION JOINT, RIGID METAL CONDUIT

- A. Weather tight, internal ground, expansion joint for galvanized rigid steel conduit, 4 inch maximum conduit movement
- B. Manufacturer
 1. ABB Type XJG Installation Products
 2. Crouse-Hinds Type XJG

3. Appleton Type XJ
4. O-Z Gedney Type AX
5. or equal

2.9 CONDUIT SEALING BUSHING

- A. Description: Bushing that provides a waterproof seal around wire and cables in a conduit
- B. Construction: Slotted PVC coated steel discs, neoprene sealing ring and stainless steel head cap screws and washers
- C. Manufacturer
 1. O-Z Gedney Type CSBI

2.10 COLD GALVANIZING COMPOUND

- A. Cold galvanizing compound shall be applied to all field threads and shall be as manufactured by ZRC Products Company, a division of Norfolk Corp. or equal.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Junction boxes shown on the Drawings shall be provided in locations indicated. Additional boxes shall be provided as needed to comply with NFPA 70 requirements.
- B. Install conduit in accordance with NECA "Standards of Installation."
- C. Install nonmetallic conduit in accordance with manufacturer's instructions.
- D. Arrange supports to prevent misalignment during wiring installation.
- E. Support rigid steel conduit using galvanized steel or galvanized malleable iron straps, pipe hangers, U-bolt clamps and beam clamps.
- F. Group related conduits; support using conduit rack. Construct rack using support channel; provide space on each for 25 percent additional conduits.
- G. Fasten conduit supports to building structure and surfaces under provisions of Section 16070.
- H. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.
- I. Arrange conduit to maintain headroom and present neat appearance.
- J. Route exposed conduit parallel and perpendicular to walls.
- K. Route conduit in and under slab from point-to-point unless drawings indicate otherwise.
- L. Maintain adequate clearance between conduit and piping.
- M. Maintain 12 inch clearance between conduit and surfaces with temperatures exceeding 104°F.

- N. Cut conduit square using saw or pipe cutter; de-burr cut ends.
- O. Before installation of wires and cables, clean and dry inside of each conduit run.
- P. For galvanized conduit, apply cold galvanizing compound to all field threads.
- Q. 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 fittings. Allow joint to cure for 20 minutes, minimum.
- R. Use conduit hubs to fasten conduit to boxes and control panels in damp locations, wet locations, and locations below fluid piping.
- S. Install no more than equivalent of three 90° bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use factory elbows for bends in metal conduit larger than 2 inch size.
- T. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
- U. Provide suitable fittings to accommodate expansion and deflection where conduit crosses control and expansion joints per Manufacturer's best practice and recommendations.
- V. Provide 100-lb. test nylon pull string in each conduit 2 inch or larger except sleeves and nipples.
- W. Use suitable caps (cast metal or thermoplastic) to protect installed conduit against entrance of dirt and moisture.
- X. Ground and bond conduit in accordance with Section 16060.
- Y. Do not penetrate waterproofing membranes in the structural floor slab or foundation walls without approval by, and in a manner acceptable to the Engineer.
- Z. Install rigid metal conduit using only threaded fittings.
- AA. Use two locknuts, one inside and one outside of each box and enclosure when enclosure ratings are NEMA 1 or 12.
- BB. Install a chromium plated, spun or split type escutcheon on all exposed conduits passing through walls or ceilings.
- CC. Extend pipe sleeves 3/4 inch above finished floors.
- DD. Install a water and fire resistant caulking around all conduits passing through floors.
- EE. Provide a separate conduit run for each 480V power circuit, unless otherwise shown on drawings.
- FF. Provide a separate conduit run for the output power wiring of each VFD.
- GG. Provide separate conduit runs for 480 and 120/208volts systems. Install motor feed and control wiring in the same conduit only when shown on the Drawings or as approved by the Engineer.
- HH. Install all empty conduits in floor so finished installation is flush with finished floor. Use suitable coupling and pipe plug.

- II. Arrange for all duct bank systems to drain away from the building.
- JJ. Provide a 4 inch band of black asphaltic paint, 2 inches in the concrete and 2 inches above floor, at all galvanized rigid steel conduit floor penetrations in pump chambers, tunnels, cellars and other below grade high moisture areas.
- KK. Provide a 4 inch band of black asphaltic paint, 2 inches in the concrete and 2 inches in the soil, at all galvanized rigid steel penetrations through floors or walls into soil.
- LL. Use stainless steel or PVC coated steel hangers and straps to support PVC conduit.
- MM. Use PVC conduit fittings and bodies with PVC conduit.
- NN. Install underground warning tape 12 inches above all underground conduits.
- OO. Install underground conduit with minimum cover, in accordance with National Electric Code or utility requirements, but no less than 36 inches.
- PP. For non-concrete encased underground conduit installations, backfill the trench with sand borrow for the full width of the trench and extend the sand borrow 12-inches over the conduit.
- QQ. Conduit penetrations in the walls of wetwells and other water or wastewater retaining structures shall be located above the maximum water elevation.
- RR. Provide conduit expansion joints for underground conduits that enter a building through an exterior wall or connect to an exterior mounted disconnect switch, meter, or other equipment.
- SS. Provide explosion proof sealing fittings where indicated on the Drawings and where required by code.

END OF SECTION

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SECTION 16136**BOXES****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes
 - 1. Wall and ceiling outlet/device boxes
 - 2. Pull and junction boxes
 - 3. Covers
 - 4. Conduit Hubs

1.2 REFERENCES

- A. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes and Conduit Bodies for Conduit and Cable Assemblies
- B. ANSI/NFPA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports
- C. NEMA 250 - Enclosures for Electrical Equipment (1000 volts maximum)
- D. UL514 A - Metallic Outlet Boxes
- E. UL514 C - Nonmetallic Outlet Boxes, Flush-Device Covers and Covers

1.3 SUBMITTALS

- A. Shop drawings, product data, and reports

1.4 PROJECT CONDITIONS

- A. Verify that the field measurements are as shown on the Drawings.
- B. Verify locations of outlets in offices and work areas prior to rough-in.
- C. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Install at location required for box to serve intended purpose. Include installation within 5 feet of location shown.

1.5 DESIGN REQUIREMENTS

- A. Unless otherwise specified or indicated on Drawings, NEMA rating for boxes shall correspond as follows to location classifications indicated on Drawings. Indoor locations for which a classification is not indicated are to be considered dry locations unless otherwise designated by Code. Outdoor locations are to be considered wet locations unless otherwise indicated.
 - 1. Dry locations - NEMA 1 Metallic Boxes
 - 2. Damp locations and Wet locations - NEMA 4 Metallic Boxes
 - 3. Class 1 Division 1 or 2 Group D - NEMA 7, gasketed, Cast Metal Boxes

PART 2 PRODUCTS**2.1 WALL AND CEILING OUTLET/DEVICE BOXES****A. Cast Metal Outlet/Device Boxes**

1. NEMA FB 1, Type FD, cast iron with internal green grounding screw terminal.
2. Shall be suitable for use in wet locations when used with gasketed covers.
3. Cover shall be by box manufacturer, and shall have stainless steel cover screws and a neoprene gasket.
4. Surface-mounted cast boxes shall have mounting lugs, do not drill through the box walls.
5. Material and coating shall match that of the conduit system being used.
6. Provide threaded sealing conduit hubs on all conduit entries.
7. Acceptable Manufacturers.
 - a. ABB Installation Products
 - b. Crouse-Hinds
 - c. Appleton
 - d. Hubbell
 - e. or equal

2.2 PULL AND JUNCTION BOXES**A. Sheet Metal Pull and Junction Boxes**

1. NEMA OS 1, Galvanized or Painted Steel.
2. Provide green grounding screw.
3. Boxes shall not contain knockouts.
4. Acceptable Manufacturers
 - a. ABB Steel City Installation Products
 - b. Raco
 - c. Appleton
 - d. or equal

B. NEMA 4X Stainless Steel Pull and Junction Boxes

1. NEMA OS 1, Type 4X Stainless Steel (16 gauge minimum). Screws shall be stainless steel.
2. Provide green grounding screw.
3. Acceptable Manufacturers

- a. Hoffman, Inc.
- b. McKinstry
- c. Wiegmann
- d. or equal

2.3 NEMA 7 EXPLOSION-PROOF BOXES

- A. Boxes shall be rated for the hazardous classification of the area, Class I, Division 1, Division 2, etc.
- B. Boxes shall be cast metal and gasketed; material and coating shall match that of the conduit system being used.

2.4 COVERS

- A. Provide covers for all boxes. Cover material and coating shall match the box, unless otherwise specified. Covers shall be screw fastened or hinged and comply with NEMA Standards OS 1, OS 2 or FB 1.

2.5 CONDUIT HUBS

- A. Conduit hubs shall be threaded and sealing type with neoprene gasket.
- B. Conduit hub material and coating shall match the box.
- C. Acceptable Manufacturers
 - 1. ABB Thomas & Betts - type "BULLET"
 - 2. Crouse Hinds - type "HUB"
 - 3. Equal by Appleton
 - 4. or equal

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install electrical boxes as shown on Drawings. Provide additional boxes as required to comply with NFPA 70 requirements, for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.
- B. Provide separate boxes for 480 and 120/208 volts systems. Install motor feed and control wiring in the same box only when shown as combined in a single raceway on the Drawings or as approved by the Engineer.
- C. Install electrical boxes to maintain headroom and to present neat mechanical appearance.
- D. Align adjacent wall-mounted outlet boxes for switches, thermostats, and similar devices with each other.
- E. Secure flush mounting box to interior wall without damaging wall insulation or reducing its effectiveness. Accurately position to allow for surface finish thickness.

- F. Fasten boxes to walls, ceilings or strut supports; do not support boxes from equipment, panels, etc.
- G. Support boxes independently of conduit, except cast box that is connected to two rigid metal conduits both supported within 12 inches of box.
- H. Use gang box where more than one device is mounted together. Do not use sectional box.
- I. Pull and Junction Boxes
 - 1. Use sealing conduit hubs on all conduit entries.
 - 2. Use stainless steel pull and junction boxes in outdoor locations

3.2 ADJUSTING

- A. Install knockout closure in unused box opening.

END OF SECTION

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SECTION 16137**CONTROL CABINETS AND ENCLOSURES****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes
 - 1. Cabinets and Construction
 - 2. Control Devices
 - 3. Uninterruptable Power Supply (UPS)
 - 4. Lightning/Surge Protection
- B. Related Sections
 - 1. Section 16070 – Electrical Hangers and Supports
 - 2. Section 16490 – Components and Accessories

1.2 REFERENCES

- A. NEMA 250 - Enclosures for Electrical Equipment (1,000 volts Maximum)
- B. ANSI/NEMA ICS 1 – General Standards for Industrial Control and Systems
- C. ANSI/NEMA ICS 6 - Enclosures for Industrial Control Equipment and Systems
- D. NFPA 70 – Article 409, Industrial Control Panels
- E. NFPA 79 – Electrical Standard for Industrial Machinery
- F. UL 508A – Standard for Industrial Control Panels
- G. UL 698A – Standard for Industrial Control Panels Relating to Hazardous (Classified) Locations

1.3 SUBMITTALS

- A. Shop drawings, product data, and reports
- B. Shop Drawings for Equipment Panels: Include project-specific wiring schematic diagram (with wire numbers for all wires), outline drawing, construction diagram and dimensions as described in ANSI/NEMA ICS 1 and NFPA 79

1.4 REGULATORY REQUIREMENTS

- A. Conform to requirements of NEC Article 409, NFPA 79, UL 508A, UL 698A and all local and federal regulations.
- B. Provide appropriate UL label on panel for the completed panel assembly. Panels received without label shall be subject to a field inspection, rework, and/or replacement at the Contractor's expense.
 - 1. UL 508A – For panels in unclassified locations

2. UL 698A – For panels in unclassified locations with intrinsically safe circuit extensions into Class I, II, and III, Division 1 and 2 hazardous (classified) locations

PART 2 PRODUCTS

2.1 CABINETS

- A. Construction: NEMA 250, Type as indicated below
- B. Cabinet materials and ratings shall be as follows (unless otherwise indicated on the drawings):
 1. Dry Locations: NEMA 12 metallic
 2. Damp locations and wet locations: NEMA 4 metallic
- C. Finish: Metallic cabinets shall have a brushed finish
- D. Covers: Continuous hinge held closed by flush latch operable by screwdriver or handle
- E. Panel for Mounting Terminal Blocks or Electrical Components: 12 gauge steel, white enamel finish

2.2 CONTROL SWITCHES AND PILOT DEVICES

- A. Provide in accordance with Section 16490.

2.3 CONTROL RELAYS

- A. Provide in accordance with Section 16490.

2.4 TERMINAL BLOCKS

- A. Type - Modular construction type, channel mounted, tubular pressure screw connectors
- B. Physical
 1. Wire Size: 22-10 AWG
 2. Rated Voltage: 600 V
 3. Rated Current: 30 A
- C. Manufacturer
 1. Entrelec
 2. Equal by Omega
 3. Or equal

2.5 DIN RAIL

- A. DIN rail shall be zinc plated steel and chromate passivated. Rail shall be 35mm wide and 7.5mm or 15mm deep. Rails may be raised with conductive standoffs. Raised rails shall be 15mm deep. Rails shall not be angled.

2.6 ALARM HORN

- A. Provide in accordance with Section 16490.

2.7 ALARM LIGHT

- A. Provide in accordance with Section 16490.

2.8 UNINTERRUPTABLE POWER SUPPLY (UPS)

- A. A UPS shall be provided for the Pump Control Panel Cabinet as specified herein or referred to in the specifications.
- B. The UPS shall be rated for 120 VAC, 60 Hz, true sine wave output online full time.
- C. The UPS shall have a rating sufficient to supply and operate each control panel and its components for a duration of 30 minutes under full load without any external power applied.
- D. Minimum size: 1500VA
- E. The UPS shall provide protection from surges and lightning.
- F. The battery shall be maintenance free and shall not emit explosive or corrosive gases during charge or discharge.
- G. Status lights shall be visible indicating normal AC line power and battery charge.
- H. The UPS shall operate properly in an ambient temperature of 0 to 40°C.
- I. Manufacturers
 - 1. American Power Conversion
 - 2. Equal by Eaton
 - 3. Or equal

2.9 LIGHTNING/SURGE PROTECTION

- A. Provide protection of all transmitters, power supplies, and data lines. Protection devices shall be installed at the field wiring terminations within the control panel.
- B. Provide protection on the 120 VAC control power circuits for control panel power supplies.
- C. Manufacturers
 - 1. Phoenix Contact – model MCR-PLUGTRAB
 - 2. Equal by Citel
 - 3. Or equal

2.10 FABRICATION

- A. All 480V electrical panels shall have a short circuit current rating (SCCR) of at least 35,000 amps. All electrical panels 240V and less shall have a short circuit current rating (SCCR) of at least 10,000 amps.
- B. Provide 10% spare I/O capacity wired to terminal blocks.
- C. Shop assemble enclosures and cabinets housing terminal blocks or electrical components in accordance with ANSI/NEMA ICS 6.

- D. Provide protective pocket inside front cover with schematic diagram, connection diagram, and layout drawing of control wiring and components within enclosure.
- E. Install a switched light and a convenience receptacle, accessible inside each cabinet.
- F. Label all devices, components, and terminal strips. Labels shall not be affixed to devices or components, but rather to the back panel on which the devices and components are mounted. Provide lamicaid tags or equal.
- G. Wire all internal panel devices that require field wiring connections to a field wiring terminal strip.
- H. Fabricate in accordance with National Electric Code, Article 409 and UL 508A.
- I. Provide wire markers on each end of each conductor as specified in 16075.
- J. Control Cabinets shall be large enough such that there is a minimum clear space of 3 inches on the sides or 4 inches on the bottom for access while connecting or servicing field wiring. Clear space need only be provided on either the side or bottom of the enclosure adjacent to the field wiring terminal strip. If there are terminal strips on both the side and bottom, clear space shall be provided to each terminal strip.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install cabinets and enclosures plumb; anchor securely to structural supports with materials and methods in accordance with Section 16070.
- B. Neatly train and lace field wiring and terminate all field wiring on terminal blocks.
- C. Clean debris from inside of enclosures and control panels.
- D. Clean outside of enclosures and control panels.
- E. Repair scratches per manufacturers recommendations.
- F. Dented enclosures and control panels shall be replaced.

END OF SECTION

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SECTION 16138**DUCT BANKS****PART 1 GENERAL****1.1 SUMMARY****A. Section Includes**

1. Nonmetallic conduit
2. Handholes
3. Installation of duct banks
4. Installation of handholes

B. Related Sections

1. Section 02315 - Excavation, Backfilling and Compaction
2. Section 03100 – Concrete Forms and Accessories
3. Section 03200 – Concrete Reinforcement
4. Section 03300 - Cast-In-Place Concrete

1.2 REFERENCES

- A. AASHTO - Standard Specification for Highway Bridges
- B. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing
- C. ANSI/SCTE 77-2007 - Specification for Underground Enclosure Integrity

1.3 SUBMITTALS

- A. Manufacturer's shop drawings
- B. Project data

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 5 years documented experience.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Accept conduit on site. Inspect for damage.
- B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

1.6 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Verify routing and termination locations of duct bank prior to excavation for rough-in.

- C. Duct bank routing is shown on Drawings in approximate locations unless dimensions are indicated. Route as required to complete duct system.

PART 2 PRODUCTS

2.1 NONMETALLIC CONDUIT

- A. Description: NEMA TC-2 Schedule 40 PVC.
- B. Fittings: NEMA TC-3.

2.2 PRECAST CONCRETE HANDHOLES

- A. Manufacturers
 - 1. Chase Precast Products
 - 2. Nashua Precast
 - 3. Arrow Concrete Products or equal
- B. Description
 - 1. Concrete Strength: Portland Cement Type I or II, air-entrained, 4500 psi compressive strength at 28 days; density 150 pcf
 - 2. Construction – bottomless, in modular sections with tongue and groove joints
 - 3. Inside dimensions – as required by NEC Article 314.28
 - 4. Knockouts for duct entry
 - 5. Cover – Concrete
 - 6. Cover loading – AASHTO H-20
 - 7. Cover markings – “ELECTRIC”, “TELEPHONE”, “COMMUNICATIONS”, as appropriate

2.3 POLYMER CONCRETE HANDHOLES

- A. Description
 - 1. Material shall be a polyester resin in combination with selectively graded aggregates.
 - 2. Material shall be resistant to ultraviolet light and unaffected by moisture and freezing.
 - 3. Loading – Designed to meet ANSI/SCTE 77-2007 requirements for 15 (22,500 lbs) applications.
 - 4. Dimensions – as required, or as indicated on the Drawings.
 - 5. Lid shall be provided by same manufacturer.
 - 6. Any and all hardware required shall be stainless steel.
- B. Manufacturers
 - 1. Quazite - Composolite

2. Newbasis
3. or equal

2.4 ACCESSORIES

A. Duct Bank Spacers

1. Type: Nonmetallic, interlocking, for multiple conduit sizes.
2. Suitable for all types of conduit.
3. Manufacturers
 - a. Underground Device, Inc.
 - b. Carlon.

B. Identification Devices

1. Raceway Tags
 - a. Material: Permanent, nylon or polyethylene.
 - b. Shape: Round.
 - c. Raceway Designation: Pressure stamped, embossed, or engraved.
 - d. Tapes relying on adhesives or taped-on markers not permitted.

PART 3 EXECUTION

3.1 DUCT BANK INSTALLATION

- A. Use Schedule 40 PVC/rigid galvanized steel conduit for all underground duct banks.
- B. Install duct in accordance with manufacturer's instructions.
- C. Install duct to locate top of duct bank at depths as indicated on drawings (or at 36 inches below grade depths not indicated on drawings).
- D. Install duct with minimum slope of 1.5 inches per 100 feet. Slope duct away from building entrances.
- E. Cut duct square using saw or pipe cutter; de-burr cut ends.
- F. Insert duct to shoulder of fittings; fasten securely.
- G. Join nonmetallic duct using adhesive as recommended by manufacturer.
- H. Wipe nonmetallic duct dry and clean before joining. Apply full even coat of adhesive to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.
- I. Install no more than equivalent of three 90 degree bends between pull points.
- J. Provide suitable fittings to accommodate expansion and deflection where required.
- K. Terminate duct at manhole/handhole entries using end bell.
- L. Stagger duct joints vertically in concrete encasement 6 inches minimum.
- M. Use suitable separators and chairs installed not greater than 4 feet on centers.

- N. Separate conduits by at least 7.5 inches center-to-center in duct banks.
 - O. Band ducts together before placing concrete.
 - P. Securely anchor duct to prevent movement during concrete placement.
 - Q. Provide the following:
 - 1. Poured in place concrete in accordance with the provisions of Sections 03100, 03200, and 03300.
 - 2. Minimum 3 inch concrete cover at bottom, top, and sides of duct bank.
 - 3. Two No. 4 steel reinforcing bars in top of bank under paved areas.
 - 4. Connect to existing concrete encasement using dowels.
 - 5. Excavation, backfill and compaction of trenches under provisions of Section 02315.
 - R. Provide suitable pull string in each empty duct except sleeves and nipples.
 - S. Swab duct. Use suitable caps to protect installed duct against entrance of dirt and moisture.
 - T. Handhole sizes shall be as required by code.
 - U. Provide handholes where shown on the Drawings and provide additional handholes where required to meet code and as required to pull wiring without damaging insulation. Coordinate locations of additional handholes with the Engineer.
- 3.2 PREPARATION FOR INSTALLATION OF HANDHOLES
- A. Contractor shall provide excavation, installation of base material, and compaction of base material in accordance with the provisions of Section 02315.
- 3.3 INSTALLATION – PRECAST CONCRETE HANDHOLES
- A. Install and seal precast sections in accordance with manufacturer's instructions.
 - B. Install handholes plumb.
 - C. Set the top of each handhole to finished grade.
- 3.4 INSTALLATION – POLYMER CONCRETE HANDHOLES
- A. Install and seal sections in accordance with manufacturer's instructions.
 - B. Install handholes plumb.
 - C. Set the top of each handhole to finished grade.
- 3.5 PROJECT RECORD DOCUMENTS
- A. Accurately record actual locations of exact routing of duct bank.
 - B. Accurately record actual locations of each handhole.

END OF SECTION

SECTION 16140**WIRING DEVICES****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes
 - 1. Wall switches
 - 2. Receptacles
 - 3. Cover plates
- B. Related Sections
 - 1. Section 16136 - Boxes

1.2 SUBMITTALS

- A. Product Data: Provide catalog sheets for wiring devices.

PART 2 PRODUCTS**2.1 WALL SWITCHES**

- A. Single Pole Switch - 20 Amp, 120/277 VOLT
 - 1. Specification grade, standard toggle, brown handle
 - a. Hubbell - Model 1221
 - b. Equal by Pass & Seymour
 - c. Equal by Bryant
 - d. or equal
- B. Hazardous area switch, single gang, 1 circuit, $\frac{3}{4}$ inch hub, rated for Class I, Div 1 & Div 2.
 - 1. Crouse - Hinds - Model EDS2129
 - 2. Equal by Killark
 - 3. Equal by Appleton
 - 4. or equal

2.2 RECEPTACLES

- A. Duplex 20A, 125 V, 1 phase, 3 wire, grounding
 - 1. Specification grade, nylon, brown, straight blade
 - a. Hubbell - Model 5362
 - b. Equal by Pass & Seymour

- c. Equal by Bryant
 - d. or equal
- B. GFCI Receptacle - 20 A, 120 V duplex
 - 1. Specification grade, nylon, brown, straight blade
 - a. Hubbell - Model GFR5362
 - b. Equal by Pass & Seymour
 - c. Equal by Bryant
 - d. or equal

2.3 COVER PLATES

- A. Decorative Cover Plate - smooth stainless steel
 - 1. Hubbell - Catalog Number
 - a. One gang duplex receptacle - S8
 - b. One gang GFCI duplex receptacle - S26
 - c. Quad receptacle - J82
 - d. One gang toggle switch - S1
 - e. Blank, one gang - S13
 - f. One gang telephone outlet - S12, S15
 - 2. Equal by Pass & Seymour
 - 3. Equal by Bryant
 - 4. or equal
- B. Weatherproof Cover - Weatherproof while in use type for outdoor and wet locations. Cast metal base with cast metal cover, sealing gasket and stainless steel mounting screws included, for duplex GFCI receptacle, vertical orientation
 - 1. ABB Red Dot Installation Products
 - 2. Equal by Hubbell, Inc.
 - 3. Equal by Pass & Seymour
 - 4. Equal by Bryant

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify outlet boxes are installed at proper height.
- B. Verify wall openings are neatly cut and will be completely covered by wall plates.

- C. Verify branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.2 PREPARATION

- A. Clean debris from outlet boxes.

3.3 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install devices plumb and level.
- C. Install switches with OFF position down.
- D. Install receptacles with grounding pole on bottom.
- E. Connect wiring device grounding terminal to outlet box with bonding jumper and branch circuit equipment grounding conductor.
- F. Connect wiring devices by wrapping conductor around screw terminal.
- G. Install corrosion resistant, weatherproof cover plates on all devices located outside, in pump chambers, garages, chemical areas, areas subject to water spray or as indicated on drawings. Cover plate material and coating shall match the box unless otherwise specified.
- H. Install decorative stainless steel plates on switches and receptacles in dry areas.
- I. Install weatherproof while in use type covers for receptacles located outdoors and in damp or wet locations.
- J. Use jumbo size plates for outlets installed in masonry walls.
- K. Use stainless steel screws and hardware for mounting, device plates, fixtures, etc. in wet, damp, hazardous and corrosive areas.

3.4 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate locations of outlet boxes provided under Section 16136 to obtain mounting heights specified and indicated on Drawings.
- B. Install wall switch 48 inches above finished floor.
- C. Install convenience receptacle 18 inches above finished floor unless otherwise noted on plans.

3.5 FIELD QUALITY CONTROL

- A. Inspect each wiring device for defects.
- B. Operate each wall switch.
- C. Verify that each receptacle device is energized.
- D. Test each receptacle device for proper polarity.

3.6 Test each GFCI receptacle device for proper operation.ADJUSTING

A. Adjust devices and wall plates to be flush and level.

END OF SECTION

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SECTION 16210

ELECTRIC SERVICE ENTRANCE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Arrangement with Utility Company for permanent electric services.
2. Payment by the Contractor/Owner for all Utility Company charges for the permanent electric services.
3. Underground service entrance.

1.2 SYSTEM DESCRIPTION

A. System Voltage:

1. 277/480 volts, three phase, 4-wire

1.3 QUALITY ASSURANCE

- A. Utility Company: Central Hudson Gas & Electric
- B. Utility Engineer: Kerri Pratt, Telephone: (845) 897-6152
- C. Install service entrance in accordance with Utility Company's rules and regulations. Obtain Utility Company approvals prior to ordering any materials or starting any construction. Inform Engineer if Utility Company requires significant changes.

PART 2 PRODUCTS

2.1 SERVICE EQUIPMENT

A. Main Service Disconnect

1. 225 amp circuit breaker with adjustable long time, short time and instantaneous (LSI) trip settings

B. Utility Meter

1. Meter socket, furnish in accordance with Utility Company requirements.
2. Meter, furnished by the Utility Company.

C. Underground Service

1. Riser pole, furnished by Utility Company.
2. Underground secondary service cable, cable terminations and cable pulling, provide in accordance with Utility Company requirements.
3. Service conduit, 4 inch Schedule 40 PVC with spare 4 inch conduit, furnish in accordance with Utility Company requirements. Provide pull cords where required. Provide concrete encasement.

4. Rigid steel sweep on riser pole and below utility meter, provide in accordance with Utility Company requirements.
5. Provide conduit expansion fitting(s) below Utility Meter.
- D. Surge Protection Device (SPD)
 1. Provide surge protection in accordance with Section 16490.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Make arrangements with Utility Company to obtain permanent electric service and to demolish the existing electric service.
- B. Coordinate installation of trench for electric service in accordance with Utility Company requirements. Coordinate backfilling of trench, in accordance with Utility Company requirements, after cables have been installed.
- C. Install electric service conduits (with pull cord where required) and cables, in accordance with Utility Company requirements.
- D. Install rigid steel sweeps and risers on Utility riser pole in accordance with Utility requirements.
- E. Install rigid steel sweeps and conduit expansion fitting(s) below utility meter in accordance with Utility requirements.
- F. Install meter socket in accordance with Utility Company requirements.

END OF SECTION

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SECTION 16232

PACKAGED ENGINE GENERATOR SYSTEMS (NATURAL GAS)

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Packaged engine generator system.
 - 2. Exhaust silencer and fittings.
 - 3. Fuel fittings.
 - 4. Battery and charger.
 - 5. Vibration isolation.
 - 6. Weather protective housing with sound attenuation

1.2 REFERENCES

- A. ANSI/NEMA 250 - Enclosures for Electrical Equipment 1000 Volts Maximum.
- B. ANSI/NEMA MG1 - Motors and Generators, including all applicable reference standards.
- C. ANSI/NFPA 70 - National Electrical Code.
- D. ANSI/NEMA AB1 - Molded Case Circuit Breakers.
- E. NFPA 110 - Standard for Emergency and Standby Power Systems

1.3 SYSTEM DESCRIPTION

- A. Engine generator system to provide standby source of power in accordance with NEC 702.
- B. System Capacity - 125 KW, 0.8 power factor, 448 starting KVA (at 35% voltage dip), 277/480 volts, 3 phase, 60 Hz at generator speed of 1800 RPM ambient temperature between -20 and 100 degrees F standby rating.
- C. Fuel System - Natural gas. Contact Utility regarding natural gas supply pressure. Coordinate pressure requirements with General Contractor to ensure correct gas pressure is supplied.
- D. Emissions - Generator set shall meet EPA and local DEP regulation requirements at the time of installation.

1.4 SUBMITTALS

- A. Shop drawings, product data and reports.
- B. Shop drawings showing plan and elevation views with overall and interconnection point dimensions, fuel consumption rate curves at various loads, ventilation and

combustion air requirements, and electrical diagrams including schematic and interconnection diagrams.

- C. Product data showing nameplate data, dimensions, weights, ratings, interconnection points, and internal wiring diagrams for engine, generator, control panel, battery, battery rack, battery charger, exhaust silencer and vibration isolators.
- D. Manufacturer's installation instructions under provisions of Section 01330.
- E. Test data for MG1-16.50, 16.51 and 16.86.2.
- F. Project Record Documents
 - 1. Accurately record location of engine generator and mechanical and electrical connections.
- G. Operation and Maintenance Data
 - 1. Submit operation and maintenance data.
 - 2. Include instructions for normal operation, routine maintenance requirements, service manuals for engine, oil sampling and analysis for engine wear, and emergency maintenance procedures.
- H. Exhaust Emissions Compliance
 - 1. EPA Exhaust Emissions Compliance Statement
 - 2. Exhaust Emissions Data Sheet

1.5 QUALIFICATION

- A. Manufacturer - Company specializing in packaged engine generator system with minimum five years documented experience.
- B. Supplier - Authorized distributor of engine generator manufacturer with service facilities within 100 miles.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site.
- B. Store and protect products.
- C. Accept packaged engine generator set and accessories on site in crates and verify damage.
- D. Protect equipment from dirt and moisture by securely wrapping in heavy plastic.

1.7 MAINTENANCE SERVICE

- A. Furnish service and maintenance of packaged engine generator system for one year from date of substantial completion. Service shall include changing oil and replacing oil and fuel filters.

1.8 WARRANTY

- A. Provide a one year manufacturer's extended comprehensive warranty for the generator system.

1.9 EXTRA MATERIALS AND SPARE PARTS

- A. Provide two additional sets of each oil filter and air filter element required for the engine generator system.

PART 2 PRODUCTS

2.1 GENERAL

- A. The engine generator set shall be the manufacturer's latest model.

2.2 MANUFACTURERS

- A. Kohler
- B. Cummins Onan
- C. Caterpillar

2.3 ENGINE

- A. Type - 4 cycle, air-cooled with integral radiator, V-type or in-line, spark ignited engine.
- B. Fuel System - Appropriate for use of natural gas.
- C. Governor - Maintain engine speed within 0.5 percent at steady state, and 5 percent from no load to full load, with recovery to steady state within 2 seconds following sudden load changes. Equip governor with means for manual operation and adjustment.
- D. Safety Devices - Engine shutdown on high water temperature, low oil pressure, overspeed, and engine overcrank. Limits as specified by manufacturer.
- E. Engine Starting - DC starting system with positive engagement, number and voltage of starter motors in accordance with manufacturer's instructions. Include remote starting control circuit, with MANUAL-OFF-REMOTE selector switch on engine-generator control panel.
- F. Engine Jacket Heater - Thermal circulation type water heater with integral thermostatic control, sized to maintain engine jacket water at 90° F and suitable for operation on 120volts AC.
- G. Engine Accessories - Fuel filter, electric fuel shut-off valve, lube oil filter, intake air filter, lube oil cooler, gear-driven water pump. Include water temperature gauge, and lube oil pressure gauge on engine-generator control panel.
- H. Mounting - The complete engine and generator assembly shall be mounted on a structural steel skid base. Vibration isolators of neoprene double deflection design between the engine generator and the base and shall be certified to be free from damaging torsional vibrations at its synchronous speed.

2.4 GENERATOR

- A. Generator - ANSI/NEMA MG 1, three phase, four pole, reconnectible brushless synchronous generator with brushless exciter capable of sustaining a minimum 250 percent of rated current for at least 10 seconds under a 3 phase symmetrical short.
- B. Insulation - ANSI/NEMA MG 1, Class F, epoxy varnish.
- C. Temperature Rise - 105° C continuous. 130° C standby.
- D. Enclosure - ANSI/NEMA MG 1, open drip proof, self-ventilated.
- E. Voltage Regulation - Include generator-mounted volts per Hertz exciter-regulator to match engine and generator characteristics, with voltage regulation ± 2 percent from no load to full load. Include manual controls to adjust voltage drop ± 5 percent voltage level, and voltage gain.
- F. Voltage Dip - Not to exceed 20 percent and shall recover to ± 2 percent of rated voltage within one second.

2.5 ACCESSORIES

- A. Exhaust Silencer - Critical type silencer, with muffler companion flanges and flexible stainless steel exhaust fitting, sized in accordance with engine manufacturer's instructions.
- B. Batteries - Heavy duty type lead acid storage batteries, capacity selected by the manufacturer. Match battery voltage to starting system. Include necessary cables and clamps.
- C. Battery Tray - Plastic coated metal or wooden tray treated for electrolyte resistance, constructed to contain spillage of electrolyte.
- D. Battery Charger - Current limiting type, 10 Amp D.C. output, designed to float at 2.17 volts per cell and equalize at 2.33 volts per cell. Include overload protection, full wave rectifier, DC voltmeter and ammeter, and 120 volts AC fused input. Provide wall-mounted enclosure to meet ANSI/NEMA 250, Type 1 requirements.
- E. Two Line Circuit Breakers - NEMA AB 1 molded case circuit breaker a on generator output with integral thermal and instantaneous magnetic trip in each pole; sized in accordance with ANSI/NFPA 70. Circuit breakers rated 200A and larger shall include mechanism for adjusting long time, short time continuous current, short time, long time pickup current, and instantaneous setting for automatic operation. Include battery-voltage operated shunt trip, connection to open circuit breaker on engine failure. Unit mount the circuit breaker on the generator. The second circuit breaker shall be dedicated for load bank testing.
- F. Provide flexible fuel lines rated 300 degrees F and 100 PSI, ending in pipe thread.
- G. Engine-Generator Control Panel - ANSI/NEMA 250, Type 1 generator mounted control panel enclosure. The control panel shall be the Decision-Maker 550 by Kohler, Power Command 2100 by Cummins, or equal, with engine and generator controls and indicators as follows:
 - 1. Output voltage adjustment.

2. Push-to-test indicator lamps, one each for low oil pressure, high water temperature, overspeed, and overcrank.
 3. Engine start/stop/auto selector switch.
 4. Engine running time meter.
 5. Auxiliary Relay 1 - DPDT, operates when engine runs, with contact terminals prewired to terminal strip.
 6. Auxiliary Relay 2 - DPDT, operates when engine fails, with contact terminals prewired to terminal strip.
- H. Vibration Isolators - If integral vibration isolation is not included with the generator set, then provide spring-type free-standing vibration isolators to support the complete engine-generator and steel skid base. Spring diameter shall not be less than 0.8 of the compressed height of the spring at the design load. Springs shall have a minimum additional travel to solid equal to 50 percent of actual deflection. All mounts shall have leveling bolts.
- I. Weather Protective Housing with Sound Attenuation
1. The generator set shall be provided with a sound-attenuated housing which allows the generator set to operate at full rated load in the ambient conditions previously specified. The enclosure shall reduce the sound level of the generator set while operating at full rated load to a maximum of 75 dBA at any location 7 meters from the generator set in a free field environment. Acoustical materials used shall be oil and water resistant. No foam materials shall be used.
 2. The enclosure shall include hinged doors for access to both sides of the engine and alternator, and the control equipment. Key-locking and padlockable door and latches shall be provided for all doors. Door hinges shall be stainless steel.
 3. The enclosure shall be rodent-proof.
 4. The enclosure shall be provided with an exhaust silencer which is mounted inside of the enclosure and allows the generator set package to meet specified sound level requirements. Silencer and exhaust shall include a raincap and rainshield.
 5. All sheet metal shall be primed for corrosion protection and finish painted with the manufacturer's standard color. All surfaces of all metal parts shall be primed and painted.
 6. Painting of hoses, clamps, wiring harnesses, and other non-metallic service parts shall not be acceptable. Fasteners used shall be corrosion resistant and designed to minimize marring of the painted surface when removed for normal installation or service work.
 7. Provide electrical stub-up area.
 8. The generator shall be furnished with an externally mounted, recessed, and factory wired emergency stop switch (break glass, pushbutton style) protected from accidental operation.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work and field dimensions are as shown on Drawings
- B. Verify that required utilities are available in proper location and ready for use.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions and requirements of NFPA-70 National Electrical Code. Provide all conduit, wiring, interconnections and grounding.
- B. Provide exhaust stack that discharges combustion gases vertically.

3.3 FIELD QUALITY CONTROL

- A. Before testing, check phasing with phase meter and make necessary wiring changes. Demonstrate correct phasing by jogging one of the three-phase motors while running on generator power.
- B. Simulate power failure including operation of transfer switch, automatic starting cycle, and automatic shutdown, and return to normal.
- C. Perform a 4 hour load bank test using a portable resistive load bank in accordance NFPA 110. The last 2 hours of the test shall be at full load.
- D. During 4 hour test, record the following at 15 minute intervals:
 - 1. Kilowatts.
 - 2. Amperes.
 - 3. Voltage.
 - 4. Coolant temperature.
 - 5. Room temperature.
 - 6. Frequency.
 - 7. Oil pressure.
- E. Test alarm and shutdown circuits by simulating conditions.

3.4 MANUFACTURER'S FIELD SERVICES

- A. Prepare, start, test, and adjust systems.

3.5 ADJUSTING

- A. Adjust generator output voltage and engine speed.

3.6 CLEANING

- A. Clean engine and generator surfaces. Replace oil and fuel filters.

3.7 DEMONSTRATION

- A. Provide systems demonstration. Describe loads connected to standby system and restrictions for future load additions.
- B. Simulate power outage by interrupting normal source and demonstrate that system operates to provide standby power to the facility for 2 hours. Confirm all equipment in the facility restarts automatically.

END OF SECTION

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SECTION 16265

AC VARIABLE FREQUENCY DRIVES

PART 1 GENERAL

A. Section Includes

1. AC variable frequency drives (VFDs).

1.2 REFERENCES

- A. ANSI/NEMA ICS 3 - Industrial Systems
- B. NEMA ICS 7.0 - Industrial Controls & Systems for VFDs
- C. IEEE 519 - Guide for Harmonic Control and Reactive Compensation of Static Power Converters.

1.3 SUBMITTALS

- A. Shop drawings, product data and reports.
- B. Project specific wiring diagrams.
- C. Operation and Maintenance Data
 1. Submit instruction manuals with recommended maintenance procedures and intervals, installation, operation and programming information.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Store drive in a warm, dry, non-corrosive location in original shipping carton to prevent damage.

1.5 SPARE PARTS

- A. One printed circuit board control card of each type furnished.
- B. Six fuses of each type furnished.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. ABB, ACS580
- B. Equal by Eaton
- C. Equal by Square D
- D. Equal by Allen-Bradley

2.2 AC VARIABLE FREQUENCY DRIVE

- A. The variable frequency AC drive shall convert 3 phase, 60 hertz input power to a variable AC frequency and voltage for controlling the speed of AC squirrel cage motors. The converter shall use a diode bridge rectifier to convert incoming AC power to a constant DC voltage bus. The inverter section shall be a voltage source

design with a sine-weighted pulse-width modulated output. The output voltage is to vary proportionally with the output frequency to maintain a constant volts/hertz value up to 60 hz.

- B. Include in the controller, power conversion components, power control logic devices and regulator circuitry. Provide full digital control of frequency and voltage.
- C. The variable frequency drives shall all be by one manufacturer.
- D. Provide VFDs large enough to handle the nameplate full load current of the installed motor; do not select VFDs based solely on motor HP. Verify the nameplate full load current of the installed motor and provide the appropriately sized VFD for the installed motor.
- E. The VFD and all associated equipment shall have a short circuit current rating (SCCR) of at least that specified in 16050.
- F. The variable torque drives shall be rated for 100% continuous current, 110% current for one minute. Constant torque drives shall be rated for 100% continuous current, 150% current for one minute.
- G. The drive shall also include as functional components: capacitors for DC bus, single control logic board, terminal blocks for connection of incoming power, motor terminations, operator controls and transient suppressor.
- H. Include motor current overload protection.
- I. Provide keypad for display and control, to be mounted on the front panel of the VFD enclosure.
- J. Enclosure: NEMA 12 (unless otherwise shown on drawings) with thermostatically-controlled cabinet fan. Other components specified herein and shown on the drawings shall be installed in the enclosure.
- K. Provide 5% line reactor (in additional to the any integral drive impedance, to help further reduce harmonics).
- L. Provide a dV/dt output filter if recommended by the pump manufacturer.

2.3 VARIABLE DRIVE FUNCTIONS

- A. Frequency Accuracy $\pm 0.5\%$.
- B. Operating Frequency Range Output: 0-60 Hz.
- C. Adjustable Two Step Acceleration and Deceleration Times: 0.1-1600 seconds.
- D. Lower Limit Frequency Adjustment: 0-60 Hz.
- E. Upper Limit Frequency Adjustment: 0-60 Hz.

2.4 VARIABLE DRIVE CONTROLS

- A. Speed control, start/stop control, local/remote control on keypad.
- B. Manual speed adjustment potentiometer, 10 turn, with dial counter, (remote mounted where indicated on Drawings).

- C. Remote speed adjustment from 4-20 mA control signal, where indicated.
- D. Remote start/stop.
- E. Contact closure for external indication of drive running and fault (rating 120 VAC, 1 AMP).

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install drive equipment in control panels as shown on the Drawings.
- B. Provide services of a factory trained technician for startup and training, a minimum of one day per type of drive installed, per location.

END OF SECTION

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SECTION 16410**SWITCHES AND CIRCUIT BREAKERS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes
 - 1. Circuit Breakers
 - 2. Switch Assemblies
 - 3. Manual Transfer Switch
- B. Related Sections
 - 1. Section 16070 – Electrical Hangers and Supports

1.2 REFERENCES

- A. NEMA AB 1 - Molded Case Circuit Breakers.
- B. NEMA KS 1 – Enclosed Miscellaneous Distribution Equipment Switches (600 Volts Maximum)

1.3 SUBMITTALS

- A. Shop drawings, product data, and reports.
- B. Circuit breaker trip current and let-through current curves, outline dimensions, and terminal lug sizes.

1.4 REGULATORY REQUIREMENTS

- A. Use circuit breakers and switch assemblies listed by Underwriter's Laboratories, Inc., and suitable for specific application.

PART 2 PRODUCTS**2.1 MANUFACTURERS**

- A. Eaton
- B. Square D
- C. Siemens
- D. Or equal

2.2 MOLDED CASE CIRCUIT BREAKER

- A. CIRCUIT BREAKER: NEMA AB-1. FS W-C-375.
- B. Service Conditions:
 - 1. Temperature: 40 C.

- C. Interrupting Rating: For circuit breakers that are part of a panelboard or other equipment, the interrupting rating shall be equal to or greater than that of the equipment. For stand-alone circuit breakers, the interrupting rating shall be a minimum of 35,000 AIC.
- D. Enclosure: NEMA 12 dust tight industrial indoor dry locations, NEMA 3R raintight (lockable) for outdoor locations.
- E. Configuration: Inverse time automatic tripping. Instantaneous automatic tripping, for motor circuit protection.
- F. Field-Adjustable Trip Circuit Breaker: NEMA AB 1; provide circuit breakers with frame sizes 200 amperes and larger with mechanism for adjusting long time, short time continuous current, short time, long time pickup current, and instantaneous setting for automatic operation.
- G. Ratings: NEMA AB 1; as scheduled.
- H. Provide a lockable hasp with each circuit breaker.

2.3 SWITCH ASSEMBLIES

- A. Interrupting Rating: The interrupting rating shall be a minimum of 35,000 AIC.
- B. Switch Assemblies: NEMA KS 1; FS W-S-865; heavy duty, quick-make, quick-break load interrupter enclosed knife switch with externally operable handle. Provide interlock to prevent opening front cover with switch in ON position. Handle lockable in OFF and ON positions. Fuse Clips: FS W-F-870. Designed to accommodate Class R fuses unless otherwise indicated.
- C. Enclosure: NEMA 12 for indoor dry locations, NEMA 3R raintight (lockable) for outdoor locations.

2.4 MANUAL TRANSFER SWITCH

- A. Manual transfer switches shall be molded case circuit breaker and cam-lock type; knife switch or fused switches are not acceptable.
- B. Manual transfer switch shall consist of (2) two mechanically-interlocked molded case circuit breakers; kirk-locks are not acceptable, cam-style male connectors, power distribution block and grounding terminals, all housed within a padlockable enclosure.
- C. Manual transfer switch enclosure shall be Type 3R, constructed of continuous seam-welded, powder coated steel. The main access shall be through an interlocked, hinged door that extends the full height of the enclosure. Access for portable generator cables with female cam-style plugs shall be via a) drawn flange cable entry openings in the bottom of enclosure for wall mount units, or b) hinged lower door for pad mount units. A hinged flap door shall be provided to cover the cable openings when cables are not connected; the hinged flap door shall allow cable entry only after the main access door has been opened. Enclosure shall be powder coated after fabrication; color shall be gray.
- D. Number of male input cams shall not exceed the number as shown on the drawings and must be rated for the specified amperage.

- E. Cam-style male connectors (inlets) shall be UL Listed single-pole separable type and rated 225 amps minimum at 600VAC. Cam-style male connectors shall be color coded. Cam-style male connectors shall be provided for each phase and for ground, and shall also be provided for neutral if required. Each of the phase cam-style male connectors within the enclosure shall be factory-wired to a molded case circuit breaker. The ground cam-style male connectors shall be bonded to the enclosure, and a ground lug shall be provided for connection of the facility ground conductor. The neutral cam-style male connectors, if required, shall be factory wired to a power distribution block. None of the cam-style male connectors shall be accessible unless both molded case circuit breakers are in the "OFF" position and the main access door is open.
- F. A power distribution block shall be provided for load-side field wiring. The power distribution block shall be factory wired to the molded case circuit breakers.
- G. Molded case circuit breakers shall be UL Listed and the short circuit interrupt rating shall be a minimum of at least that specified in 16050. Trip rating of the molded case circuit breakers shall be as shown on the drawings. One molded case circuit breaker shall be fed from utility power; the other molded case circuit breaker shall be fed from the cam-style male connectors to supply power from a portable generator. Both molded case circuit breakers shall include UL Listed door-mounted operating mechanisms (with provisions for a locking device), preventing the opening of the main access door unless both breakers are in the "OFF" position. Both molded case circuit breakers shall be mounted behind a deadfront panel. The load-side of the molded case circuit breakers shall not be energizable unless the main access door is closed and one of the molded case circuit breakers is in the "ON" position. The (2) molded case circuit breakers shall be safety interlocked by mechanical means to ensure that only one breaker can be closed at any given time.
- H. Manual transfer switch shall include permanently affixed operation instructions.
- I. Manufacturer:
 - 1. ESL Power Systems, Inc., StormSwitch Series
 - 2. Equal by Eaton
 - 3. Equal by Siemens
 - 4. Or equal

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Verify field measurements are as shown on Drawings.
- C. Verify that required utilities are available, in proper location, and ready for use.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide all necessary hardware and supports and make all wiring connections.

- C. Provide fuses in all fusible switch assemblies, sized for specific circuit.

3.3 ADJUSTING

- A. Adjust trip settings so that circuit breakers coordinate with other overcurrent protective devices in the circuit. Use trip settings provided by the Engineer.

3.4 FIELD QUALITY CONTROL

- A. Inspect visually and perform several mechanical ON-OFF operations.
- B. Verify circuit continuity on each pole in closed position.

END OF SECTION

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SECTION 16415**AUTOMATIC TRANSFER SWITCH****PART 1 GENERAL****1.1 SUMMARY****A. Section Includes**

1. Automatic transfer switch.

1.2 REFERENCES

- A. NEMA ICS 2 - Standards for Industrial Control Devices, Controllers, and Assemblies.
- B. NFPA 70 - National Electrical Code.
- C. UL 1008 - Standard for Automatic Transfer Switches.

1.3 QUALITY ASSURANCE

- A. Manufacturer - Company specializing in automatic transfer equipment with 3 years documented experience.

1.4 SUBMITTALS

- A. Shop drawing, product data and reports.
- B. Product data for transfer switches showing overall dimensions, electrical connections, electrical ratings, and environmental requirements.
- C. Operation and Maintenance Data
 1. Submit operation and maintenance data.
 2. Include instructions for operating equipment.
 3. Include instructions for operating equipment under emergency conditions when engine generator is running.
 4. Identify operating limits which may result in hazardous or unsafe conditions.
 5. Document ratings of equipment and each major component.
 6. Include routine preventative maintenance and lubrication schedule.
 7. List special tools, maintenance materials, and replacement parts.

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable National Electrical Code for emergency standby electrical systems.

PART 2 PRODUCTS**2.1 MANUFACTURERS**

- A. Russelectric
- B. ASCO
- C. Zenith Controls
- D. or equal

2.2 AUTOMATIC TRANSFER SWITCH

- A. Description - NEMA ICS 2; automatic transfer switch. Equipment to be designed, manufactured, and tested in accordance with UL 1008 and NEMA ICS2, Part 2-447.
- B. Configuration - Electrically-operated, mechanically-held "break-before-make", open transition transfer switch.

2.3 RATINGS - NEMA ICS 2; AS FOLLOWS:

- A. Voltage - 480 volts, three phase, four wire, 60 Hertz.
- B. Switched Poles - 3.
- C. Load Inrush Rating - Combination Tungsten Lamp, electric discharge lamp, resistive load.
- D. Continuous Rating - 225 amperes.
- E. Withstand Current Rating - 35,000 rms symmetrical amperes, when used with molded case circuit breaker.

2.4 AUTOMATIC SEQUENCE OF OPERATION

- A. Initiate Time Delay to Start Alternate Source Engine Generator - Upon initiation by normal source monitor.
- B. Time Delay to Start Alternate Source Engine Generator - 0 to 300 seconds, adjustable.
- C. Initiate Transfer Load to Alternate Source - Upon initiation by normal source monitor and permission by alternate source monitor.
- D. Time Delay Before Transfer to Alternate Power Source - 0 to 300 seconds, adjustable.
- E. Initiate Retransfer Load to Normal Source - Upon permission by normal source monitor.
- F. Time Delay Before Transfer to Normal Power - 0 to 300 seconds, adjustable; bypass time delay in event of alternate source failure.
- G. Time Delay Before Engine Shut Down - 0 to 10 minutes, adjustable, of unloaded operation.
- H. Programmed Transition - Transfers load to neutral position for 0-10 seconds (adjustable), disconnected from sources, to allow inductive load voltages to decay.

- I. Programmable Engine Exerciser - A 7/14 day electronic time switch with digital display for automatic weekly or bi-weekly testing of the engine-generator set. The exerciser shall be fully programmable and backed up by a permanent battery, and shall allow automatic testing with or without load. The system shall bypass exerciser control if normal source fails during exercising period.
- J. Engine Cranking Timer - Open starter circuit if engine fails to start after 45 seconds.

2.5 ACCESSORIES

- A. Indicating Lights - Mount in cover of enclosure to indicate NORMAL SOURCE AVAILABLE, ALTERNATE SOURCE AVAILABLE, SWITCH POSITION.
- B. Test Switch - Mount in cover of enclosure to simulate failure of normal source.
- C. Transfer Switch Auxiliary Contacts - 1 normally open; 1 normally closed.
- D. Normal Source Monitor - Monitor each line of normal source voltage; initiate engine starting when voltage drops below 70 percent after a 3 second time delay. Initiate retransfer when voltage is restored to greater than 90 percent of rated value.
- E. Alternate Source Monitor - Monitor alternate source voltage and frequency; inhibit transfer when voltage is below 80 percent.
- F. In-Phase Monitor - Inhibit transfer until power source and load are within 10 electrical degrees.
- G. Provide timer to prevent excessive transfer and retransfer operation during momentary line voltage dips.
- H. Loss of Single Phase Detection - Monitors voltage on all three phases; initiates engine starting when any phase is lost after 100 msec time delay.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Verify field measurements are as shown on Drawings.
- C. Verify that required utilities are available, in proper location, and ready for use.

3.2 INSTALLATION

- A. The automatic transfer switch shall be mounted on the wall as shown on the Drawings.
- B. Set the programmed transition to provide enough time delay for all motor driven equipment to come to a complete stop.
- C. Set the in-phase monitor for 10 electrical degrees. Adjust the following time delay settings as required.
 - 1. Set the time delay to start alternate source engine generator at 10 seconds.
 - 2. Set the time delay before transfer to alternate power source at 0 seconds.

3. Set the time delay before transfer to normal power at 60 seconds.
4. Set the time delay before engine shut down at 10 minutes.

3.3 FIELD QUALITY CONTROL

- A. Test transfer switch operation by opening the main disconnect to simulate a power outage. Observe startup of the generator and transfer of load to the generator. Close the main disconnect. Observe transfer to utility power and engine cool down and shut down. Record time delays.
- B. Where possible, correct malfunctioning transfer switch at site, and then retest to demonstrate compliance. Otherwise remove the transfer switch and ship it back to the manufacturer for repair or replacement.

3.4 PERSONNEL TRAINING

- A. Operating Personnel Training - Train personnel in procedures for starting-up, testing and operating transfer switches and auxiliary equipment.

END OF SECTION

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SECTION 16440**PANELBOARDS****PART 1 GENERAL****1.1 SUMMARY**

- A. Section Includes
 - 1. Panelboards
 - 2. Molded case circuit breakers
- B. Related Sections
 - 1. Section 16075 – Electrical Identification
 - 2. Section 16410 - Switches and Circuit Breakers

1.2 REFERENCES

- A. NEMA PB 1 - Panelboards.
- B. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less

1.3 SUBMITTALS

- A. Provide outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.

PART 2 PRODUCTS**2.1 MANUFACTURERS - PANELBOARDS**

- A. Panelboards, 208/120 volt with mains from 100 amperes to 400 amperes, max 42-84 branch circuits and no branch breakers over 100 amperes, shall be:
 - 1. Eaton, PRL-1
 - 2. Square D, NQOD
 - 3. Siemens, P1
 - 4. General Electric, AQ
 - 5. or equal
- B. Panelboards, 480/277 volt or 208/120 volt with mains from 100 amperes to 400 amperes, max 60 branch circuits with MCB, or max 74 branch circuits with MLO, and no branch breakers over 225 amperes, shall be:
 - 1. Eaton, PRL-3
 - 2. Square D, NF or I-Line
 - 3. Siemens, P3
 - 4. General Electric, AD

5. or equal

2.2 PANELBOARDS

- A. Panelboards: NEMA PB-1; circuit breaker type
- B. Enclosure: NEMA Type 1 or as indicated on Drawings
- C. Provide cabinet front with hinged cover, and hinged door with flush lock. Finish in manufacturer's standard gray enamel.
- D. Provide panelboards with copper bus, ratings as scheduled on Drawings. Provide copper ground bus in all panelboards. Provide separate insulated neutral bus, where required.
- E. Provide factory installed lockable hasps for all breakers.
- F. Ratings
 - 1. All panels and individually mounted circuit breakers shall have short circuit ratings as follows:
 - a. 240 Volt Class Panels/Breakers
 - 1) 10 kAIC
 - b. 480 Volt Class Panels/Breakers
 - 1) 35 kAIC
 - c. All panelboards shall be UL listed and labeled. Panels shall have ratings not less than the short circuit ratings available from the power sources.
 - d. Panelboards shall be labeled with a UL short circuit rating. Panelboards shall be fully rated.
- G. Trims
 - 1. Trims for all panelboards shall be supplied with a door-in-hinged-door. Interior door shall cover all circuit breaker handles and not uncover any live parts. Outer hinged door shall have a piano/continuous hinge and shall open to provide access to all wire gutter space on both sides of circuit breakers. Doors shall have a semi-flush cylinder lock and catch assembly. Doors over 48 inches in height shall have auxiliary fasteners. Refer to drawings for surface or recessed mounted. Switching device handles shall be accessible.

2.3 MOLDED CASE CIRCUIT BREAKERS

- A. Provide circuit breakers in accordance with Section 16410.
- B. Provide bolt-in circuit breakers with integral thermal and instantaneous magnetic trip in each pole.
- C. Provide factory installed lockable hasps for all breakers.
- D. Field-Adjustable Trip Circuit Breaker: NEMA AB 1; provide circuit breakers with frame sizes 200 amperes and larger with mechanism for adjusting long time, short time continuous current, short time, long time pickup current, and instantaneous setting for automatic operation.

- E. Trip-free mechanism independent of manual handle control.
- F. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits.
- G. Do not use single pole breakers with handle tie for multipole use.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Panel board shall be wall mounted as shown on the Drawings.
- B. Install wall mounted panelboards plumb in conformance with NEMA PB 1.1, at a height of 6 feet to the top of the panelboard.
- C. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.
- D. Make all electrical connections including grounding.
- E. Provide engraved nameplates in accordance with Section 16075.

3.2 FIELD QUALITY CONTROL

- A. With all equipment connected and functioning normally, measure steady state load currents at each panelboard feeder. Should the difference at any panelboard between phases exceed 20%, rearrange circuits in the panelboard to balance the phase loads within 20%. Take care to maintain proper phasing for multi-wire branch circuits.
- B. Visual and Mechanical Inspection - Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers, fusible switches, and fuses.

END OF SECTION

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SECTION 16460

DRY TYPE TRANSFORMERS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Dry type two winding transformers

1.2 REFERENCES

- A. ANSI/NEMA ST 20 - Dry Type Transformers for General Applications

1.3 SUBMITTALS

- A. Include outline and support point dimensions of enclosures and accessories, unit weight, voltage, KVA, impedance ratings and characteristics, loss data, efficiency at 25, 50, 75 and 100 percent rated load, sound level, tap configurations, insulation system type, and rated temperature rise.
- B. Nameplate data per NEMA ST20-3.26

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver to site and store in a warm, dry location with uniform temperature. Cover ventilating openings to keep out dust.
- B. Handle transformers using only lifting eyes and brackets provided for that purpose. Protect units against entrance of rain, sleet, or snow if handled in inclement weather.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Eaton
- B. Square D
- C. Siemens
- D. Or equal

2.2 DRY TYPE TWO WINDING TRANSFORMERS

- A. Dry Type Transformers: ANSI/NEMA ST 20; factory-assembled, air cooled dry type shielded transformers; ratings as shown on the Drawings
- B. Case temperature shall not exceed 65°C rise above a 30°C ambient at its warmest point.
- C. Winding Taps, Transformers 15 KVA and Larger: four 2½ % manually adjustable taps. Two below and two above rated voltage.
- D. Sound Levels: ANSI/NEMA ST 20
- E. All terminal compartments shall be located near the bottom of the transformers.

- F. Basic Impulse Level: 10 KV
- G. Ground core and coil assembly to enclosure by means of a visible flexible copper grounding strap.
- H. Mounting: Transformers shall be suitable for wall mounting where shown on the Drawings.
- I. Coil Conductors: Continuous aluminum windings with terminations brazed or welded.
- J. Enclosure: ANSI/NEMA ST 20; Type 1. Provide lifting eyes or brackets.
- K. Isolate core and coil from enclosure using vibration-absorbing mounts.
- L. Nameplate: Include transformer connection data and overload capacity based on rated allowable temperature rise.
- M. Finish with two coats of ANSI 61 gray.
- N. Terminal Connections: Copper bus or lead wire
- O. Shielding for Isolation Transformers: Grounded faraday shield between primary and secondary windings to provide harmonic frequency attenuation of 50:1 or 34 db.
- P. Ventilation openings shall be designed such that foreign objects inserted through these openings are deflected from energized parts.

PART 3 EXECUTION

3.1 INSTALLATION OF TRANSFORMERS

- A. Set transformer plumb and level.
- B. Mount transformers on vibration isolating pads for isolating the transformer noise from the building.
- C. Name all wiring connections, including grounding.
- D. Install separate grounding electrode for bonding of neutral and all ground connections.
- E. Furnish and install supports for all transformers.

3.2 FIELD QUALITY CONTROL

- A. Check for damage and tight connections prior to energizing transformer.
- B. Measure primary and secondary voltages and make tap adjustments.
- C. Perform routine, design, prototype, and sound level tests for each unit rating.

END OF SECTION

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SECTION 16490

COMPONENTS AND ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Control switches and pilot devices
2. Control relays, time delay relays
3. Control power transformers
4. Elapsed time meters
5. Repeat cycle timers
6. Audible alarm devices
7. Spring wound timer
8. Intrinsically safe barrier for float switches
9. Alarm light
10. Alarm horn
11. Surge Protection Device (SPD)

1.2 REFERENCES

- A. NEMA ICS 1 - General Standards for Industrial Control Systems
- B. NEMA ICS 2 - Standards for Industrial Control Devices, Controllers and Assemblies

1.3 SUBMITTALS

- A. Drawings to NEMA ICS 1 indicating control panel layouts, wiring connections and diagrams, wire numbers, dimensions, support points, nameplate legends
- B. Project Record Documents
 1. Accurately record actual locations of control equipment. Revise diagrams included in Drawings to reflect actual control device connections.
- C. Operation and Maintenance Data
 1. Provide instructions for adjusting and resetting time delay relays, timers, and counters.
 2. Provide recommended preventive maintenance procedures and materials.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum 3 years documented experience

1.5 SPARE PARTS

- A. Furnish 2 complete control switches, pilot devices, and relays with contacts for each type utilized in this project.
- B. Furnish 1 complete time delay relay and clock timer complete with contacts for each type utilized in this project.

PART 2 PRODUCTS

2.1 CONTROL SWITCHES AND PILOT DEVICES

- A. Mounting Hole: 30.5mm
- B. Contact: NEMA ICS 2; Form C
- C. Contact Rating: NEMA ICS 2; A150, 10 amps
- D. Type: Industrial heavy duty oil tight type, waterproof (NEMA 4) or explosion proof (NEMA 7) as required and/or indicated on the Drawings, pushbuttons, selector switches, and stop buttons
- E. Indicating Lights: LED. Lens color as indicated on Drawings. Lights which are not illuminated during normal equipment operation, such as "Fault" and "Warning", shall be push-to-test.
- F. Legend Plates with markings and weatherproof requirements as indicated on the Drawings. Legend plates for emergency stops shall be yellow background.
- G. Manufacturers
 - 1. Eaton/Cutler-Hammer, Model 10250T (w/Logic Level Blocks or class I, Div. 2 rated blocks as required)
 - 2. Allen-Bradley, 800T/800H (w/PenTuff Blocks or class I, Div. 2 rated blocks as required)
 - 3. Equal by Square D
 - 4. or equal

2.2 CONTROL RELAYS, TIME DELAY RELAYS

- A. Contacts: Form C, convertible contacts, each relay shall include at least one spare set of contacts
- B. Contact Rating:
 - 1. Relays for non-motor loads: Pilot Duty Rating NEMA C300, R300; 15 Amp @ 120VAC inductive, 7.5A @ 240VAC inductive, 7 Amp @ 277VAC general purpose, 7 Amp @ 30VDC resistive
 - 2. Relays for motor loads: Rated insulation voltage 250V IEC, 300V UL; 1/3HP @ 120VAC, 3/4HP @ 240VAC.
- C. Coil Voltage: 120 volts, 60 Hz., AC unless otherwise required for application.
- D. Relay: Interposing/isolation relay, square base, rail mounted

- E. Electrical life (cycles): 100,000 minimum
- F. Time Delay Relays: Dial type timing relay with timing range from .05s to 300 hrs, DPDT 5 Amp contacts, din rail mounting, specific model as required for specific control application.
- G. Manufacturers
 - 1. Allen Bradley: Bulletin 700, 700-HC for non-motor loads, 700-HK for motor loads, Bulletin 700-HR dial type time delay relay
 - 2. Equal by Eaton/Cutler Hammer
 - 3. Equal by Square D
 - 4. or equal

2.3 CONTROL POWER TRANSFORMERS

- A. Transformer: NEMA ST 1; machine tool transformer with isolated secondary winding
- B. Power Rating: 75 va, minimum
- C. Voltage Rating: 480 volts primary; 120 volts secondary

2.4 AUDIBLE ALARM DEVICES

- A. Type: Solid State audible electric signaling device
- B. Voltage: 120V
- C. Output: 80-95 dB at 2 feet
- D. Manufacturers
 - 1. Mallory Type SC110N
 - 2. Equal by Federal Signal
 - 3. or equal

2.5 INTRINSICALLY SAFE BARRIER FOR FLOAT SWITCHES

- A. Description: Intrinsically safe barrier
- B. Voltage: 120 volts
- C. Number of Inputs: 4
- D. Outputs: 4 isolated NO/NC contacts. Rated for 3A up to 250V AC, or 2A at 24V DC
- E. Manufacturer
 - 1. IDEC, EB3C Series
 - 2. Equal by Allen Bradley
 - 3. Or equal

2.6 ALARM LIGHT

- A. Type: Heavy duty LED alarm light with non-metallic base and lens
- B. Description: NEMA 4X, Class I, Division 2, glass-reinforced thermoplastic polyester resin base, shatter-resistant polycarbonate fresnel lens
- C. UL listed for Class I, Division 2 locations
- D. Flash Rate: Field-selectable, 65 flashes per minute or steady on
- E. Color as indicated in drawings or schedule.
- F. Mounting: Wall (Conduit, if necessary)
- G. Power: 120VAC or 24VDC, as required
- H. Manufacturer
 - 1. Edwards-Signaling 105XBRM
 - 2. Equal by Federal Signal
 - 3. Equal by Course-Hinds
 - 4. or equal

2.7 ALARM HORN

- A. Type: Diaphragm NEMA 4X
- B. Construction: Zinc die-casting housing, stainless steel diaphragm, weatherproof back box
- C. Voltage: 120 VAC
- D. Output: Adjustable, 78 to 101 dB (at 10 feet)
- E. Manufacturer
 - 1. Edwards Signaling, Model 870P-N5 (120 VAC model)
 - 2. Equal by Federal Signal
 - 3. Equal by Crouse-Hinds
 - 4. Or equal

2.8 SURGE PROTECTION DEVICE (SPD) – ENCLOSED STAND ALONE

- A. UL 1449, 4th Edition listed
- B. Surge current/phase (8/20 μ s): 1 Event: 200kA
- C. Surge Life/Phase (8/20 μ s): 10,000 Events: 10kA
- D. Service Voltage: 277/480 volts, three-phase
- E. Features:
 - 1. LED status indicators for protection present and protection reduced.
 - 2. Audible alarm with silence button

3. EMI/RFI filtering
 4. Form C relay contact for fault/power loss signal
 5. Surge counter with reset button
- F. Modes of protection: Line-to-neutral, line-to-ground, line-to-line, neutral-to-ground.
- G. Each phase shall be guarded by at least three redundant protection paths.
- H. Lead length shall be as short and straight as possible, avoiding ninety-degree bends in the wire (LB fittings or similar will not be accepted). If the installed lead length must exceed five feet, the contractor shall use a low impedance cable that minimizes the lead length impact to the installed performance of the SPD.
- I. Enclosure: NEMA 4, 14 gauge steel, powder coated.
- J. 10 year warranty
- K. Manufacturer:
1. MCG Surge Protection Model 200LS-277Y
 2. Equal by Citel
 3. Or Equal
- L. Provide a 30 amp circuit breaker disconnect for the SPD.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install devices and equipment in accordance with manufacturer's instructions.
- B. Install individual relays and time delay relays in enclosures.
- C. Make electrical wiring interconnections as shown on Drawings.

END OF SECTION

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SECTION 16500**LUMINAIRES****PART 1 GENERAL****1.1 SUMMARY**

- A. Examine all drawings and all other Sections of the Specifications for requirements which affect work under this Section whether or not such work is specifically mentioned in this Section.
- B. Coordinate work with that of all other Trades affecting or affected by work of this Section. Cooperate with such Trades to ensure the steady progress of all work under the Contract.
- C. Provide all material, labor and equipment, to complete the work of this Section in strict accordance with the design engineer's plans and specifications, and with all applicable codes, rules, and standards.
- D. The work under this Section shall include furnishing and installing interior and exterior lighting fixtures.
- E. The work under this Contract shall also include all labor, materials, tools, equipment, transportation, insurance, temporary protection, supervision and incidental items essential for proper installation and operation, even though not specifically mentioned or indicated on the drawings, but which are usually provided or are essential for proper installation and operation of all systems as indicated on the drawings and specified herein.
- F. The specifications and drawings describe the minimum requirements that must be met by the Contractor for the installation of all work as shown on the drawings and as specified hereinunder.

1.2 SUBMITTALS

- A. Prepare and submit complete shop drawings of lighting fixtures required on this project to the Engineer for approval. Refer to specification section 01330 for additional information.
- B. Submit samples of each material under this Section requested by the Engineer for approval. Samples shall be in size and form requested by the engineer, and reasonable to show characteristics, color and finishes of the materials.
- C. Submit complete manufacturer's product data of all materials and systems to the engineer for approval, consisting of complete product description and specifications, complete performance test data, complete preparation and installation instructions, dimensions and all other pertinent technical data required for complete product and product use information.
- D. All shop drawings shall have clearly marked the appropriate specification number of drawing designation for identification of the submittal.

- E. Disposition of shop drawings shall not relieve the Contractor from the responsibility for deviations from drawings or specifications unless he has submitted, in writing, a letter itemizing or calling attention to such deviations at time of submission and secured written approval from the Engineer, nor shall such disposition of shop drawings relieve the Contractor from responsibility for errors in shop drawings or schedules.
- F. Shop drawings, samples, test data and certificates shall be submitted for approval in accordance with the requirements of the Contract Documents. Fixtures or other materials shall not be shipped, stored or installed into the work unless prior approval has been received, based upon the submittal of shop drawings, samples, catalogue cuts, test data, certificates or other materials submitted for approval. Make modifications to fixtures in accordance with Engineers comments concerning submittals, as a part of the work of this Section.
 - 1. For each and every light fixture type the manufacturer shall submit the following information in the order listed below.
 - a. Light fixture cut sheet
 - b. Fixture accessories
 - c. Lamp cut sheet

1.3 REFERENCED STANDARDS

- A. Applicable provisions of the following Codes and Trade Standard Publications shall apply to the work of this Section, and are hereby incorporated into, and made a part of, the Contract Documents:
 - 1. NFPA 70: National Electrical Code
 - 2. UL: Underwriters' Laboratories
 - 3. NEC: National Electrical Code
 - 4. CBM: Certified Ballast Manufacturers Association
 - 5. IES: Illuminating Engineering Society
 - 6. ASTM: American Society for Testing and Materials
 - 7. ANSI: American National Standards Institute

1.4 SUBSTITUTIONS

- A. No substitutions shall be permitted. The Contractor shall submit one (1) of the fixtures listed for each fixture type as indicated.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery of materials shall be made to the project by the materials supplier in accordance with the instructions of the Contractor.
- B. The Contractor shall provide adequate storage space for the materials, shall be responsible for all items of materials after receipt from the supplier, and shall replace all materials lost or damaged after delivery and receipt.

- C. The Contractor shall furnish the materials supplier with receipts for all materials and accessory items received, and shall send copies of these receipts to the Engineer.

PART 2 MATERIALS

2.1 GENERAL

- A. Provide materials, equipment, appurtenances and workmanship for the work of this Section conforming to the highest commercial Standards as specified and indicated on the drawings. Make fixture parts and components not specifically identified or indicated on the drawings, of materials most appropriate to their use or function, and resistant to corrosion and to thermal and mechanical stresses encountered in the normal application and function of the fixtures.

2.2 MATERIALS AND FABRICATION

- A. Provide fixtures, completely factory assembled, wired, and equipped with necessary sockets, wiring, shielding, reflectors, channels, lenses and other parts and appurtenances necessary to complete the fixture installation and deliver to project site ready for installation.

2.3 FINISHES

- A. The engineer shall select finishes and indicate the color selections on the shop drawing submittals.

2.4 FIXTURE WIRING

- A. Provide wiring channels and wireways free from projections and rough or sharp edges throughout. At points or edges over which conductors shall pass and may be subject to injury or wear, round bush to make a smooth contact surface with the conductors.
- B. Install insulated bushings at points of entrance and exit of flexible wiring.

2.5 LED LIGHT FIXTURES, DRIVERS AND MODULES

- A. Provide drivers for LED lamps that are suitable for the electrical characteristics of the supply circuits to which they are to be connected, and which are suitable for operating the specified lamps.
- B. Provide drivers conforming to UL, ETL and ANSI Specifications and displaying labels or symbols of approval by the UL or ETL and of certification as tested by the UL / ETL. Design, fabricate and assemble component parts of drivers in accordance with the latest requirements of the NEC. This Driver protection shall be provided by a built-in self-resetting thermally actuated device that shall remove the driver from line when excessive driver temperature is reached.
- C. Rigidly mount drivers to the inside of the top of the fixture housing, with driver surfaces and housing in complete contact for efficient conduction of driver heat, unless specifically indicated to the contrary. Permanently affix driver mounting screws to the fixture housing. Provide only fixtures whose design, fabrication and assembly prevent overheating or cycling of LED's and drivers under any condition of use.
- D. Provide identical drivers within each fixture type unless otherwise noted.

- E. Switched fixtures which incorporate battery inverter packs for emergency lighting circuits shall include a second "hot leg" conductor to allow for fixtures to be switched without activating the battery inverter pack. Battery inverter packs shall only be activated during loss of normal power.
- F. LED light fixtures shall be Reduction of Hazardous Substances (RoHS) – compliant.
- G. LED drivers shall include the following features unless otherwise indicated:
 - 1. Minimum efficiency: 85% at full load
 - 2. Minimum Operating Ambient Temperature: -20° C (-4° F).
 - 3. Input Voltage: 120/277V ($\pm 10\%$) at 60Hz.
 - 4. Integral short circuit, open circuit, and overload protection
 - 5. Power Factor: ≥ 0.95 .
 - 6. Total Harmonic Distortion: $\leq 20\%$
 - 7. Comply with FCC 47 CFR Part 15
 - 8. Provide 0-10V dimming controls.
- H. LED modules shall include the following features unless otherwise indicated:
 - 1. Comply with IES LM-79 and LM-80 requirements.
 - 2. Minimum color rendering index (CRI) 82.
 - 3. Color temperature shall be 4100K unless otherwise specified in Lighting Fixture Schedule. Color temperature shifts shall comply with ANSI C78 377A for LED binning with further sub-binning restrictions of chromatic to be at or below the visual threshold of perceivable color variation not exceeding the 3 step MacAdam Ellipse line that crosses the black body locus as indicated on the LM79 report. Such restrictions documentation compliance shall be submitted as part of the submittal process.
 - 4. Minimum Rated Life: 50,000 hours per IES L70
 - 5. Light output lumens in accordance to the specified manufacturer and catalog number as indicated in the Lighting Fixture Schedule.

2.6 LENSES/FACEPLATES/TRIM

- A. Where plastic lenses are indicated provide lenses of virgin methyl methacrylate, unless otherwise indicated.
- B. Make lenses, louvers, or other light diffusing elements contained in frames removable, but positively held within the frames so that hinging or other motion of the frame shall not cause the diffusing element to drop out.

2.7 EXTERIOR FIXTURES

- A. Provide fixtures designed and manufactured specifically for outdoor service. Make components, including nuts, bolts, rivets, springs, and similar parts, of materials of

effective corrosion resistance, or of materials which have been subjected to finishing treatment which shall ensure such resistance.

- B. Provide fixtures for use outdoors or in areas designated as wet or damp locations, which are suitably and effectively gasketed to prevent access of moisture into electrical components or enclosing diffusers, lenses or globes.
- C. Provide metal parts of fixtures for use in outdoor, wet or damp locations which are specified as requiring painting with suitable weather and moisture resisting qualities equal to epoxy-based coatings.
- D. Provide anodized aluminum for aluminum parts of exterior fixtures which are not specified as requiring a painted finish.

2.8 FIXTURE DESCRIPTIONS

- A. Provide fixtures that conform to the above Standards and criteria as indicated on the drawings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrate and supporting grids for luminaires.
- B. Examine each luminaire to determine suitability for lamps specified.
- C. Examine excavation and concrete foundation for lighting poles.

3.2 INSTALLATION

- A. Install in accordance with manufacturers instructions, NEC, and as indicated on Drawings.
- B. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prohibit movement.
- C. Install accessories furnished with each luminaire.
- D. Unless otherwise shown, connect emergency lighting units and exit signs to same circuit that feeds the surrounding lighting. Use flexible conduit.
- E. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
- F. Bond products and metal accessories to branch circuit equipment grounding conductor.

3.3 FIELD QUALITY CONTROL

- A. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

3.4 ADJUSTING

- A. Adjust exit sign directional arrows as indicated.

- B. Replace fixtures that have failed at Substantial Completion.

3.5 CLEANING

- A. Clean electrical parts to remove conductive and deleterious materials.
- B. Remove dirt and debris from enclosure, clean finishes and touch up damage.
- C. Clean photometric control surfaces as recommended by manufacturer.

END OF SECTION

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**CITY OF BEACON
&
METRO-NORTH RAILROAD**

**ENTRY PERMIT
HU-21-8 MP 59.10**

4/2020

METRO-NORTH COMMUTER RAILROAD COMPANY

PERMIT TO ENTER UPON PROPERTY

PERMISSION is hereby granted to **City of Beacon**, (hereinafter called "Permittee") to enter property owned by Metropolitan Transportation Authority (hereinafter called "MTA") and managed by Metro-North Commuter Railroad Company (hereinafter called "Railroad" or "Metro-North"), a public benefit corporation and subsidiary of MTA. The purpose of this Entry Permit shall be solely for the purposes outlined in Section 1 below and under the following terms and conditions:

1. LOCATION AND ACCESS. Permission is hereby granted to Permittee and its contractor(s), if any, to enter Hudson Line property, at or near the northeast corner of the Beacon Station parking lot, on the north side of the West Street entrance to perform field survey, site assessment, geotechnical borings and engineering design activities, as well as to construct a sanitary pump station on the site in support of the City of Beacon's West Main Pump Station Project, in the City of Beacon, in the County of Dutchess, in the State of New York (hereinafter called "Property").

2. LIABILITY. Permittee covenants and agrees to at all times indemnify, protect and save harmless Midtown Trackage Ventures, LLC (known as "Midtown"), the State of Connecticut and the Connecticut Department of Transportation, National Railroad Passenger Corporation (Amtrak), CSX Transportation, Inc. and New York Central Lines LLC, Delaware & Hudson Railway Company, Inc., MTA and Metro-North Railroad (collectively, the "Indemnitees") from and against any and all losses, damages, detriments, suits, claims, demands, costs and charges, including but not limited to reasonable attorneys' fees and disbursements, which any or all of the Indemnitees may directly or indirectly suffer, sustain or be subjected to by or on account of Permittee's entry upon, occupancy or use of the Property, or the conduct thereon of Permittee, its contractors, subcontractors, officers, employees, agents, or invitees, whether such loss or damage be suffered or sustained by any or all of the Indemnitees directly or by other persons (including employees of any or all of the Indemnitees or corporations who may seek to hold any or all of the Indemnitees liable therefor), and whether attributable to the fault, failure or negligence of any or all of the Indemnitees.

3. CONSIDERATION. Permittee will pay to the Railroad the non-refundable sum of **WAVIED (\$)** as compensation for the application and preparation of this Entry Permit and right of

entry upon the Property. Upon execution and delivery of this Entry Permit, Permittee also will pay to the Railroad the sum **OF FIVE THOUSAND DOLLARS AND NO/100 (\$5,000.00)**, which is Railroad's cost estimate for performing the services enumerated in Paragraph 7 of this Entry Permit. It is understood and agreed that this payment is an advance deposit based upon the estimated costs and does not constitute a lump sum price for the performance of this work. Railroad may request an additional deposit in the event that the value of the services performed pursuant to Paragraph 7 are projected to exceed the amount of the original deposit and Railroad may discontinue its performance hereunder in the event of Permittee's failure to deposit the additional amount requested. If the costs of the actual services provided by Railroad are less than the estimated amount paid, Railroad will promptly refund the overpayment.

4. NOTIFICATION TO RAILROAD. After completion of the entry permit process, Permittee or its contractor(s) shall notify the Railroad or its designee, **Mr. Richard Ramkeesoon, Assistant Director of Capital Engineering (212)499-4444; Ramkeesoon@mnr.org**, at least ten (10) business days in advance before entering upon or commencing any work upon the Property and keep said designee fully advised of all activities. No entry or use of the Property will be permitted until this Entry Permit is executed by both parties, any charges thereunder are paid, any required insurance is obtained and evidence of such insurance in a form satisfactory to the Railroad is provided and until Railroad has advised that it is in a position to handle the request.

5. RAILROAD OPERATIONS. All activities of Permittee shall be carried on in such a manner so as not to interfere with the safe operation or use of any Railroad facilities.

6. HAZARDOUS SUBSTANCES. (a) Permittee shall not cause or permit any Hazardous Substance (as hereinafter defined) to be used, stored, generated, or disposed of on or in the Property by Permittee, Permittee's agents, employees, contractors or invitees, without first obtaining Railroad's written consent, which may be withheld at Railroad's sole and absolute discretion. If Hazardous Substances are used, stored, generated or disposed of on or in the Property, or if the Property becomes contaminated in any manner for which Permittee is legally liable, Permittee shall indemnify, defend (with counsel approved by Railroad), and hold harmless the Indemnitees from any and all claims, damages, fines, judgments, penalties, costs, liabilities, or losses (including, without limitation, a decrease in value of the Property or surrounding property of MTA or Railroad, damages because of adverse impact on marketing of any space, and any and all sums paid for settlement of claims and for attorneys', consultant, and expert fees) arising during or after the term of this Permit and arising as a result of such contamination by Permittee. This indemnification includes,

without limitation, any and all costs incurred because of any investigation of the site or any cleanup, removal or restoration required or requested by a federal, state or local agency or political subdivision or by any organized labor group, including, without limitation, any such costs associated with the contamination of adjacent property or ground water as a result of Permittee's activities at the Property. In addition, if Permittee causes or permits the presence of any Hazardous Substance on the Property and this results in contamination, Permittee shall promptly, at its sole expense, take any and all necessary actions to return the Property to the condition existing before the presence of any such Hazardous Substances on the Property, provided, however, that Permittee shall first obtain Railroad's approval for any such remedial action.

(b) As used herein, "Hazardous Substance" means (i) any substance which is toxic, ignitable, reactive, or corrosive and which is regulated by any local government, the State of New York or the United States government, (ii) any "hazardous waste", "extremely hazardous waste," "hazardous substance," "toxic substance," "hazardous material," "pollutant" or "contaminant," as defined in state, federal or local governmental law or (iii) any substance whose presence could be detrimental to the Property or hazardous to health or the environment, including but not limited to radioactive materials, including radon, natural gas, natural gas liquids (all of the foregoing gas called "Natural Gas Products"), liquefied natural gas, synthetic gas or mixtures of Natural Gas Products and synthetic gas, lead, asbestos containing materials, polychlorinated biphenyls ("PCBs"), and petroleum products.

7. RAILROAD SUPPORT PERSONNEL AND PAYMENT. In addition to, but not in limitation of any other provisions of this Permit, if at any time the Railroad should deem inspectors, flagmen, watchmen, or maintenance of way personnel desirable or necessary to protect its operations or property, or its employees, patrons or licensees during the term of this Permit, the Railroad shall have the right to place such inspectors, flagmen, watchmen or maintenance of way personnel at the sole expense of Permittee. Metro-North will provide protective forces to the extent possible considering operational and maintenance priorities. Metro-North makes no guarantee that protective personnel will be available to meet the Permittee's preferred schedule. Further, no such work may actually commence until the assigned Metro-North representative affirmatively advises the Permittee that the necessary protective forces are stationed and that the Permittee may proceed. The instructions from Metro-North flagmen or other representatives on the job site must be strictly and promptly obeyed by the Permittee, its contractor and their employees. A failure to follow instructions from railroad personnel on the site will lead to withdrawal of this Entry Permit, thus closing the Property to Permittee and its contractor(s). The costs for such inspectors, flagmen, watchmen

or maintenance of way personnel shall include, but not necessarily be limited to wages, applicable fringe benefits, payroll taxes and overhead rates and shall be calculated in accordance with currently applicable rules in effect pursuant to the collective bargaining agreements with the respective crafts at the time the work is performed.

Examples of currently effective work rules and fringe/overhead rates are set forth on Attachment A to this Entry Permit. These examples are given as information only to enable Permittee to calculate the approximate costs which will be incurred pursuant to this permit agreement. The full cost and expense of any flagmen, inspectors, watchmen or maintenance of way personnel shall be billed by Railroad and Permittee agrees to pay the full cost less the amount on deposit within fifteen (15) days after final billing. Any questions regarding invoicing or payment under this Entry Permit should be addressed to **Collections Analyst, Metro-North Railroad, 420 Lexington Avenue, 2nd Floor, New York, New York 10170, telephone (212) 340-2326.**

The furnishing or failure to furnish inspectors, flagmen, watchmen or maintenance of way personnel by the Railroad, shall not release Permittee from any and all other liabilities assumed by the Permittee under the terms of this Entry Permit. No entry or work commenced by Permittee shall take place without inspectors, flagmen or watchmen when Railroad deems such inspectors, flagmen or watchmen necessary. There shall be no entry upon Railroad property without specific authorization from a Railroad representative on the site. Moreover, no equipment or material shall be transported across the tracks without special permission from Railroad.

8. PERMITTEE PERSONNEL. At each job location, Permittee must furnish an English-speaking supervisor who is capable of communicating (including translating as necessary) instructions from the flagmen or other Metro-North representative to the contractor's personnel on the job. Such supervisor must remain on the scene at all times while work is being performed or any contractor employees are on or about the railroad right-of-way.

9. CLEARANCES. All equipment working on or material in use upon the Property shall be kept at all times not less than fifteen (15) feet from the nearest rail of any track, or as subsequently modified in writing by Railroad or its designee. The Permittee and/or its contractor(s) shall conduct its operations so that no part of any equipment shall foul any track, transmission, signal or communication lines, or any other structure of the Railroad.

10. RESTORATION OF PREMISES. Upon completion of Permittee's activities, the Property shall be restored to a condition satisfactory to the Railroad and this instrument shall become null and void, save and except only as to any liability accrued prior thereto. This includes, without limitation, the

restoration immediately of any fences removed. If, at the sole discretion of the Railroad, the Property has not been satisfactorily cleared of all of Permittee's property (including but not limited to materials and equipment) and restored to an acceptable condition, then MTA or Railroad shall have the right, but not the obligation, to restore the Property, including the removal of any materials, equipment and/or fencing, to a satisfactory condition at Permittee's sole cost and expense.

11. TERM OF PERMIT. Railroad reserves the right to revoke this Entry Permit at any time. Unless subsequently modified, this Entry Permit shall begin **OCTOBER 1, 2021**, and shall end **upon completion of the project**, at which time it shall expire automatically. Under no circumstances shall this temporary Entry Permit be construed as granting the Permittee any rights, title or interest of any kind or character in, on, or about the land or premises of MTA or Railroad thereafter. The Permittee agrees to notify Railroad when use of the Property or work is completed.

12. INSURANCE. Permittee, or its contractor, shall for the entire term of this permit, maintain, at its sole expense the insurances set forth in Section C of Metro-North's Construction Management Specifications for Individuals and Companies (I & C) Working on or Adjacent Railroad Property ("Specifications"), which Specifications are incorporated herein and made a part hereof.

Railroad may, at its discretion, procure, provide and thereafter maintain in effect during the life of this Permit for and on behalf of Railroad any and all force account insurance deemed necessary by Railroad. The provision of such insurance shall not be deemed a limitation on any liability of Permittee arising under the terms of this Permit. The premium paid by Railroad for such force account insurance coverage shall be reimbursed by Permittee in accordance with the provisions of Paragraph 7 of this Agreement.

13. NOTICES. Any notice to be served pursuant to this Entry Permit shall be delivered by hand against a receipt or by U.S. Certified Mail, Return Receipt Requested, postage pre-paid, addressed as follows:

If to Railroad:

Metro-North Railroad
420 Lexington Avenue, 11th Floor
New York, New York 10170
Attention: Vice President & General Counsel

If to Permittee:

**City of Beacon
1 Municipal Plaza
Beacon, NY 12508
ATTN.: Christopher White**

14. ADDITIONAL PERMISSION(S). Permittee shall be responsible for obtaining any additional permission which may be required including, but not limited to, those which are or may be necessary to photograph a person, or the name, trademark or logo of a business while on the Property. Otherwise, Permittee shall not use the name, trademark or logos of any of the Indemnitees for any purpose, nor shall any such name, trademark or logo appear in any of the photographs taken by Permittee.

15. APPLICABLE LAWS. Permittee, at its sole expense, shall comply with all Federal, State and local Laws, regulations and ordinances applicable to the Property.

16. ROADBED SETTLEMENT. Permittee shall be obligated to remedy any settlement caused to the roadbed, right of way and/or tracks, facilities, and appurtenances of the Railroad as a result of his entry on the Property; and should Permittee fail to do so, Railroad may so remedy at the sole expense of the Permittee.

17. INDUCTIVE INTERFERENCE. Permittee shall be obligated to remedy any inductive interference resulting from its presence on the Property; and should Permittee fail to do so, Railroad may so remedy at the sole expense of the Permittee.

18. ASSIGNMENT. Permittee shall make no assignment of this Entry Permit without prior written consent of the Railroad. Any such assignment, or attempt to assign, without written consent of the Railroad, is void.

19. FORCE MAJEURE. Any obligations of Railroad hereunder shall be subject to "Force Majeure", which shall include, but not be limited to, labor disruptions such as strikes.

20. OTHER TERMS AND CONDITIONS.

21. ACCEPTANCE. Permittee will indicate acceptance of the above conditions by signing two counterparts of this Entry Permit and returning them to: **R. Webster, Assistant Director of Standards and Specifications, Metro-North Railroad, 420 Lexington Avenue, 10th Floor, New York, New York 10170; (212) 499-4533; rwebster@mnr.org.**

IN WITNESS WHEREOF, the parties hereto have caused this Entry Permit to be duly executed as of the day and year indicated below.

**METRO-NORTH COMMUTER RAILROAD
COMPANY**

WITNESS:

BY: _____

David Melillo

David Melillo

TITLE: VICE-PRESIDENT ENGINEERING

DATE: 10/27/21

CITY OF BEACON

WITNESS:

Calli Melon

BY: _____

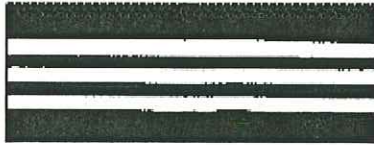
Chantal A. Lunt

TITLE: City Administrator (Permittee)

DATE: 10/19/2021



FILED EASEMENT AGREEMENT



Dutchess County Clerk Recording Page

Record & Return To:

Date Recorded: 8/10/2021

Time Recorded: 9:38 AM

KEANE & BEANE PC
ATTN: NICHOLAS M. WARD-WILLIS ESQ
445 HAMILTON AVE SUITE 1500
WHITE PLAINS, NY 10601

Document #: 02 2021 3656

Received From: KEANE & BEANE PC

Grantor: METROPOLITAN TRANSPORTATION AUTHORITY

Grantee: BEACON CITY

Recorded In: Deed

Tax District: City of Beacon

Instrument Type: EASE

Examined and Charged As Follows :

Recording Charge: \$310.00
Transfer Tax Amount: \$0.00
Includes Mansion Tax: \$0.00
Transfer Tax Number: 218

Number of Pages: 53

*** Do Not Detach This Page

*** This is Not A Bill

Red Hook Transfer Tax:

RP5217: N

TP-584: Y

County Clerk By: aco

Receipt #: 27208

Batch Record: 166

Bradford Kendall
County Clerk



0220213656

c/B 520
305
310

GRANT OF SEWER PUMP STATION UTILITY EASEMENT

THIS GRANT OF SEWER PUMP STATION UTILITY EASEMENT (this "Easement") made this 13th day of July, 2021, by and between the METROPOLITAN TRANSPORTATION AUTHORITY, a public benefit corporation of the State of New York with offices at 2 Broadway, New York, New York 10004 ("Grantor") and the CITY OF BEACON, a New York municipal corporation with offices at City Hall, 1 Municipal Plaza, Beacon, New York 12508 ("Grantee").

W I T N E S S E T H:

WHEREAS, Grantor is the owner of certain real property located in the City of Beacon, County of Dutchess and State of New York, as more particularly described in Schedule "A" annexed hereto and made a part hereof (the "Property"); and

WHEREAS, Metro-North Commuter Railroad Company, a public benefit corporation of the State of New York and a subsidiary of Grantor ("Metro-North") operates, among other things, a commuter railroad line serving, a northerly section of the greater New York City area known as the Hudson Line (the "Railroad"); and

WHEREAS, Grantee wishes to construct a sanitary sewer pump station on the Property and Grantor agrees to grant an easement for the construction, operation, maintenance and repair of sanitary sewer lines, including pump stations, with respect to certain portions of the Property and this Easement relates to a sanitary sewer pump station (the "Sewer Pump Station");

NOW, THEREFORE, in consideration of the premises and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Grantor hereby grants, releases and conveys unto Grantee an easement as follows:

1. GRANT OF EASEMENT

Subject to the terms, conditions and limitations set forth in this Easement, Grantor hereby grants unto Grantee; (i) an easement in, on, under and through all those portions of the Property labeled "Pump Station Area" (the "Pump Station Area") on the survey annexed hereto and made a part hereof as Schedule B (the "Survey") and described in Schedule B-1 hereto, for the purposes of constructing, operating, maintaining, repairing, reconstructing, replacing and inspecting the Sewer Pump Station and the underground pipes, conduits and related appurtenances for the transportation of sewage to and from the Pump Station Area through the Easement Area (collectively, the "Permitted Uses"); and (ii) the right of ingress and egress in, on, under and through all those portions of the Property labeled "Ingress/Egress Access Area" (the "Access Area") on the Survey, and described in Schedule B-1 hereto, to and from the Pump Station Area for persons, motor vehicles and construction equipment necessary to perform the aforesaid Permitted Uses.

2. PROHIBITION OF STRUCTURES

Grantor is hereby prohibited from constructing and/or maintaining any type of permanent structure on the surface of the Easement Area without Grantee's permission, which permission shall not be unreasonably withheld, conditioned or delayed; provided, however, that the foregoing shall not restrict Grantor's use of the existing sign on the Easement Area, including, without limitation, modifications or additions thereto and the display thereon.

3. RESTORATION

All areas disturbed by exercise of the easement conferred herein shall be restored by Grantee, as soon as reasonably practicable following such disturbance and at Grantee's expense, to the condition that existed prior to the disturbance.

4. DURATION

The provisions of this Easement shall be covenants running with the land as long as this Easement is in place and is in full force and effect and shall bind and inure to the benefit of Grantee's and Grantor's respective successors and assigns, unless terminated pursuant to the provisions hereof. In the event this Easement is abandoned by Grantee, or terminated by Grantor in accordance with the terms hereof, Grantee agrees to, upon request of Grantor, promptly execute such instruments in recordable form as Grantor shall reasonably request to terminate this Easement of record.

5. MODIFICATION

This Easement shall not be modified unless any such modification is approved by Resolution of the City Council of the City of Beacon and accepted in a writing executed and acknowledged by Grantor and Grantee, or their respective representatives, successors and/or assigns, and recorded in the Office of the Dutchess County Clerk.

6. ENTRY PERMIT

Notwithstanding the fact that the access over the Property is granted by this Easement, Grantee must obtain an entry permit (the "Entry Permit") from Metro-North Commuter Railroad Company ("Metro-North") at any time it wishes to enter the Easement Area, including but not limited to, any entry onto the Easement Area for the performance of the work for, and any repair or rebuilding of, the Sewer Pump Station; provided, however, that an Entry Permit shall not be required for Grantee's access to the Easement Area for routine inspection and maintenance that does not involve construction work. The parties agree that replacement of pumps within the Sewer Pump Station, to the extent performed within the fenced-in Pump Station Area without the

use of any lift or crane, or other similar construction machinery or equipment, shall constitute routine maintenance, and not require an Entry Permit. Further, an Entry Permit shall not be required in advance for access to the Easement Area to perform emergency repairs. In the event such emergency repairs involve construction work, Grantee shall provide notice by telephone as soon as practicable and shall limit construction activities to those required to address the emergency condition(s) until such time as an Entry Permit is obtained. In connection with obtaining an Entry Permit, Grantee must comply with the requirements of Metro-North for projects in effect at the time of the proposed entry. Metro-North's current (1) general procedure for access to Railroad property is set forth in Exhibit "A", attached hereto and made a part hereof, and (2) requirements for architectural drawings are set forth in Exhibit "B", attached hereto and made a part hereof.

7. ENFORCEMENT

Grantee shall have the right to enforce these covenants, restrictions and easements by proceeding at law or in equity, against any person or persons violating or attempting to violate any provision of this Easement, to restrain violation, to require specific performance and/or to recover damages, to enforce or foreclose any lien created by these covenants and to recover any legal fees incurred in connection with the foregoing. Failure by Grantee to enforce any provision of this Easement herein contained shall in no event be deemed a waiver of the right to do so thereafter.

8. MAINTENANCE

Grantee, for itself and its successors and assigns, does hereby agree that maintenance of the Easement Area shall be the responsibility of Grantee at its sole cost and expense. In the event the Easement Area is disturbed or damaged by acts of the Grantor in any way, Grantor shall at its

sole cost and expense restore the Easement Area to as near a condition as such area was prior to such disturbance.

9. INDEMNIFICATION

Grantee shall indemnify, defend (with counsel approved by Grantor) and hold harmless each of the parties listed at Section B of Schedule "C" annexed hereto and made a part hereof and the State of New York and their respective agents, servants, directors, officers and employees existing currently or in the future and successors thereof (collectively, the "Indemnitees") from and against any and all losses, damages, detriments, suits, claims, demands, costs and charges, including attorneys' fees and disbursements, which any or all of the Indemnitees may directly or indirectly suffer, sustain or be subjected to arising in whole or in part, directly or indirectly, by reason of or in connection with, Grantee's or its contractor's entry upon, occupancy or use of Grantor's property (including the Easement Area) or the activities or presence thereon of Grantee or its contractor, whether such loss or damage be suffered or sustained by any or all of the Indemnitees, directly or by other persons (including employees of any or all of the Indemnities or corporations who may seek to hold any or all of the Indemnitees liable therefor) including third party claims on account of injury or death of any person(s) whatsoever or damage to any property owned by or in the care, custody or control of Grantor (or any of their respective affiliates or subsidiaries) and whether attributable in whole or in part directly or indirectly, to the fault, failure or negligence of Grantee or its contractor. The obligations of Grantee under this Section 9 shall survive the termination of this Easement. Grantor shall give written notice of any asserted claim or suit for which indemnification is requested under this Easement and shall cooperate in the defense of such claim or suit. Grantee

shall not settle any claim or related action required to be defended pursuant to this Section 9 without the prior written consent of the related Indemnitee.

10. ENVIRONMENTAL

Grantee does hereby agree to release, indemnify, defend (with counsel approved by Grantor) and hold harmless the Indemnitees from and against any and all claims, damages (personal and property), fines, causes of action, judgments, penalties, costs and expenses (including, without limitation attorneys', consultant(s) and expert fees), liabilities, losses and awards of any kind or nature whatsoever regarding the presence, use, generation, or remediation of, any Hazardous Substance (as hereinafter defined) arising or resulting from, or in connection with, the use or occupancy of the Easement Area, or any other work or activity undertaken by any person or entity (including without limitation any construction, or maintenance work) by or on behalf of Grantee in connection with the Easement or the improvements constructed and maintained by Grantee on the Easement Area, whether or not occurring on the Easement Area, and will not seek contribution from the Indemnitees towards the costs Grantee has or may in the future incur in connection with remediation of any Hazardous Substance. This Release and Indemnification includes without limitation any and all costs incurred because of any investigation of the Easement Area or any clean-up, removal or restoration required or requested by a federal, state or local agency or political subdivision or by any organized labor group, including without limitation, any such costs associated with the contamination of adjacent property or groundwater arising out of any environmental contamination on or emanating from the Easement Area as a result of Grantee's activities on or near the Easement Area. As used herein, "Hazardous Substance" means (i) any substance which is toxic, ignitable, reactive, or corrosive and which is regulated by any local government, the State of New York or the United

States government: (ii) any "hazardous waste," "extremely hazardous waste," "hazardous substance," "toxic substance," "hazardous material," "pollutant," or "contaminant," as defined in state, federal or local law; or (iii) any substance whose presence could be detrimental to the Easement Area, or hazardous to health or the environment, regardless of source, including but not limited to radioactive materials, including radon, natural gas, natural gas liquids (all of the foregoing gas called "Natural Gas Products"), liquefied natural gas, synthetic gas or mixtures of Natural Gas Products and synthetic gas, lead, asbestos containing materials, polychlorinated biphenyls ("PCBs"), cutting oil, diesel, gasoline, oils and all other petroleum products. This paragraph 10 will survive the termination and/or revocation of this Easement.

11. SEVERABILITY

Should any term or provision of this Easement be declared to be void, invalid, illegal or unenforceable, for any reason, by the adjudication of any court of other tribunal having jurisdiction over the subject matter hereof, such judgment shall in no way affect the other provisions hereof which are hereby declared to be severable and which shall remain in full force and effect.

12. INSURANCE

a. At all times during the effectiveness of this Easement, Grantee shall comply with the obligations set forth in Schedule "C" annexed hereto, to the extent applicable, as determined by Grantor, including, without limitation, procuring or causing to be carried, at its sole cost and expense or that of its contractor, and maintaining in force at all times during the effectiveness of this Easement, policies of insurance in accordance with the terms set forth in Schedule "C". The parties agree that the Railroad Protective Liability Insurance described in Schedule "C", Section "A", Paragraph 7 shall not be required with respect to work performed within the Pump Station

Area, unless it requires activity within fifty (50) feet of the tracks. To the extent that Grantee is satisfying any of the indemnification and/or insurance requirements hereunder through its contractor, Grantee shall cause each such contractor to sign and deliver to Grantor an agreement of indemnification and insurance in the form annexed to this Easement as Schedule "D".

b. Prior to the execution of this Easement, copies of current certificates of insurance evidencing the insurance coverage required by this Easement shall be delivered to Grantor. During any entry onto Grantor's property (including the Easement Area) by Grantee or any party acting on Grantee's behalf pursuant to this Easement, Grantee shall require its contractor(s) to supply to Grantor, for approval before any work is begun, proof of the insurance coverages set forth in Schedule "C" annexed hereto.

c. The minimum amounts of insurance required in this Agreement shall not be construed to limit the extent of Grantee's liability under this Agreement.

d. Grantee further agrees to provide, at Grantee's sole cost and expense, such increased or expanded insurance coverage as Grantor may, from time to time, deem appropriate.

e. Grantee shall secure an appropriate clause in, or endorsement upon, each insurance policy obtained by and covering or applicable to the Easement Area or the personal property, fixtures, and equipment located therein, pursuant to which the insurance company waives subrogation or permits the insured, prior to any loss, to agree with a third party to waive any claim it might have against said third party without invalidating the coverage under the insurance policy. The waiver of subrogation or permission for waiver of any claim shall extend to the Indemnitees. Grantee hereby releases the Indemnitees in respect of any claim (including a claim for negligence) which it might otherwise have against the Indemnitees for loss, damage, or

destruction with respect to Grantee's property by fire or other casualty occurring during the effectiveness of this Agreement.

f. The insurance required to be carried by Grantee pursuant to the provisions of this Agreement may, at Grantee's option, be effected by so-called "blanket", "wrap-up" and/or "master" policies issued to Grantee covering the Easement Area and other properties owned or leased by Grantee, provided such policies (i) otherwise comply with the provisions of this Agreement, and (ii) by endorsement, allocate to the Easement Area the specified coverage and limits of coverage herein required for all insureds required to be named as insureds hereunder.

g. If, at any time during the effectiveness of this Agreement, insurance as required hereunder is not in effect, or proof thereof is not provided to Grantor, Grantor, without any liability to Grantee, shall have the option to: (i) direct Grantee to immediately suspend work or operation with no additional cost or extension of time due on account thereof, or (ii) treat such failure as a breach of this Agreement; and Grantor may, at its option, in addition to and without limiting any of Grantor's rights and remedies against Grantee under this Easement at law or in equity, immediately terminate this Easement, and in such event, all the rights and privileges of Grantee hereunder shall thereupon immediately cease and terminate.

13.. CONSTRUCTION

This grant shall not be construed in any way nor is it intended to convey any interest in the land nor any right upon the surface of said property or under or above the ground in the aforementioned parcel of land except for the purpose stated above.

14. NOTICES

Except as otherwise expressly provided in this Easement, all notices, demands, requests, submissions or other communications which are required to be given under this Easement shall

be in writing and shall be given either by hand delivery against a receipt or by U.S. Certified Mail, Return Receipt Requested, postage pre-paid or by reputable overnight courier service, via next business day delivery, addressed as follows:

To Grantor:

Metropolitan Transportation Authority,
2 Broadway, 4th Floor
New York, New York 10004,
Attention: Director, Real Estate Transactions and Operations

With a copy to:

Metropolitan Transportation Authority,
2 Broadway, 20th Floor
New York, New York 10004,
Attention: General Counsel.

To Grantee:

City of Beacon
City Hall
1 Municipal Plaza
Beacon, New York 12508

With a copy to:

Keane & Beane, P.C.
445 Hamilton Avenue, 15th Floor
White Plains, New York 10601
Attn: Nicholas M. Ward-Willis, Esq.

15. MISCELLANEOUS

- (a) Grantor has full right and lawful authority to make the grant contained herein.
- (b) This Easement shall be governed by, construed, and enforced in accordance with the laws of the State of New York.
- (c) This Easement constitutes the entire agreement between the parties

and any prior understanding or representation of any kind preceding the date of this agreement shall not be binding on either party except to the extent incorporated herein.

- (d) Grantor agrees to fully cooperate with Grantee to adjust and/or correct for any clerical errors herein, including but not limited to the re-execution of this Easement, or the execution of any further documentation necessary for this Easement to be recorded in the Office of the Dutchess County Clerk.
- (e) If Grantee shall discontinue using the Pump Station Area for the Permitted Uses for a period in excess of two (2) consecutive years, then Grantee's rights hereunder shall be forfeited and the Easement Area shall revert to Grantor and this Easement shall no longer be in full force and effect.

16. NO ASSIGNMENT OR TRANSFER BY GRANTEE

In recognition of the requirements of Section 2897 of the Public Authorities Law, Grantee expressly agrees that Grantee will not transfer the interest in the Easement Area granted hereunder and that the interest in the Easement Area granted hereunder and use thereof shall remain with Grantee.

17. CONSIDERATION

The consideration payable by Grantee to Grantor for the interest granted hereunder is One and 00/100 Dollars (\$1.00), payment waived.

18. LIEN LAW

- (a) Prior to Grantee making any improvements of the Property pursuant to this Easement or in connection with construction of the Sewer Pump Station that have an estimated cost in excess of two hundred fifty thousand dollars (an "Eligible Improvement"), Grantee shall demonstrate to

the satisfaction of the Grantor that it has complied with the requirements set forth in Section 5 of Article 2 of the New York Lien Law by either (i) establishing a public fund to finance the costs of such improvement(s), or, if no such public fund is established, (ii) posting, or causing to be posted, a bond or other form of undertaking (an "Undertaking") acceptable to Grantor guaranteeing prompt payment of moneys due to Grantee's contractor or contractors (the "Eligible Improvement Contractor") performing such Eligible Improvement, such Eligible Improvement Contractor's subcontractors and to all persons furnishing labor or materials to the Eligible Improvements Contractor or its subcontractors in the prosecution of the Eligible Improvement.

(b) Grantee shall not commence work on any Eligible Improvement until Grantee has obtained written confirmation from Grantor, the delivery of which shall not be unreasonably withheld or delayed by Grantor, that Grantee has met its obligations under Section 18(a) above.

19. GRANTOR'S RESERVED RIGHTS

(a) Grantee hereby acknowledges that Grantor's primary purpose and obligation is to operate the Railroad. The rights and privileges hereby granted shall be exercised by Grantee subject at all times to the prior and paramount right of Grantor, in its absolute discretion, to operate the Railroad according to the requirements and exigencies of the public interest and the business of Grantor.

(b) Grantor reserves the right to make such improvements to the Easement Area as it deems necessary for the operation of the Railroad, provided that such improvements shall not materially obstruct or materially adversely affect the use of the Easement Area.

20. RECORDATION

Grantee shall be solely responsible for recording this Easement at Grantee's sole cost and expense. Grantor shall reasonably cooperate with Grantee and execute and deliver any and all documentation reasonably required to accomplish said recordation.

IN WITNESS WHEREOF, the parties have executed this Easement as of the date first appearing above, intending the same to be recorded in the Office of the Dutchess County Clerk.

METROPOLITAN TRANSPORTATION CITY OF BEACON
AUTHORITY

By: 

David Florio

By: 

Christopher White, City Administrator

Title: Director, Real Estate Transactions
and Operations, Authorized Signatory

STATE OF NEW YORK }
 }s.s.:
COUNTY OF NEW YORK }

On the 13 day of July in the year 2021, before me, the undersigned, a notary public in and for said state, personally appeared DAVID FLORIO, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity, and that by his signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

D Smith - Santos
Notary Public

STATE OF NEW YORK }
 }s.s.:
COUNTY OF DUTCHESS}

DALILAH J. SMITH-SANTOS
Notary Public, State of New York
No. 01SM6337087
Qualified in New York County
Commission Expires Feb. 16, 2024

On the 6th day of May in the year 2021, before me, the undersigned, a notary public in and for said state, personally appeared CHRISTOPHER WHITE, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity, and that by his signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

Emily Westbrook
Notary Public

TAX DESIGNATION:

Section: 5954
Block: 25
Lot 549980
City of Beacon

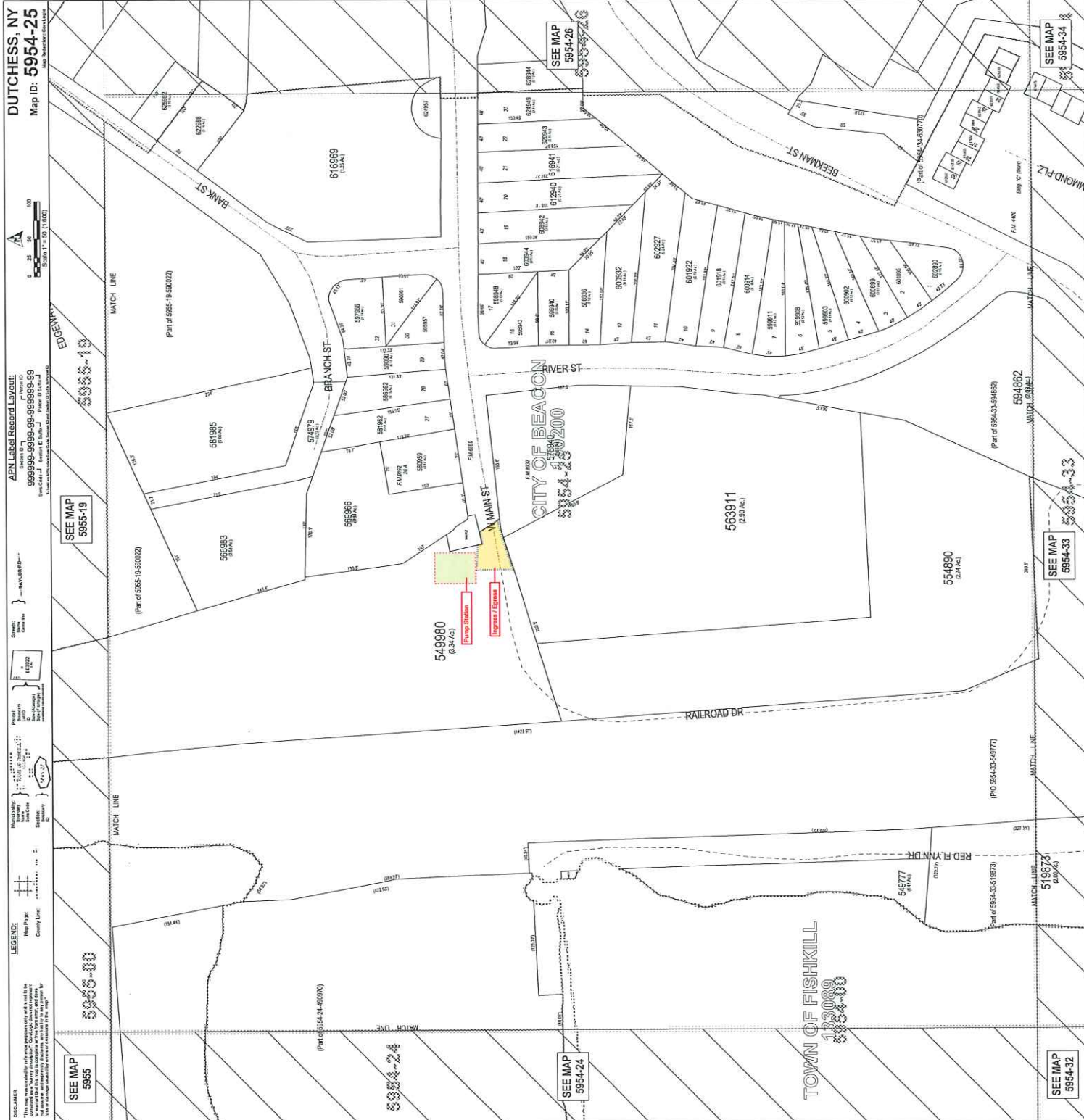
EMILY J. WESTBROOK
Notary Public, State of New York
Registration #02WE6157103
Qualified In Dutchess County
Commission Expires Dec. 4, 2022

RECORD AND RETURN TO:

Nicholas M. Ward-Willis, Esq.
Keane & Beane, P.C.
445 Hamilton Avenue
Suite 1500
White Plains, New York 10601

SCHEDULE "A" – DESCRIPTION OF THE PROPERTY

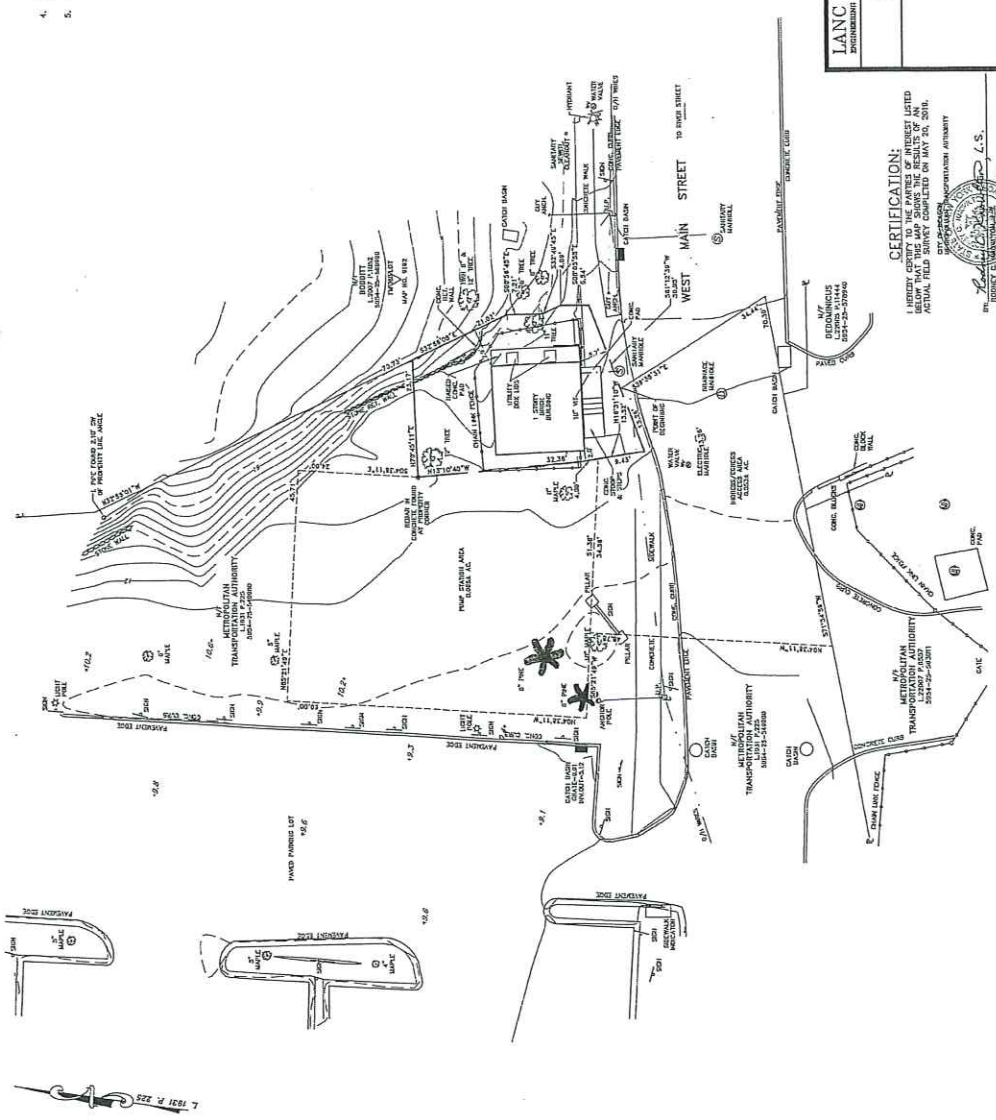
All that certain plot, piece, or parcel of land, with the buildings and improvements thereon erected, situate, lying and being in the City of Beacon, County of Dutchess, and State of New York bearing tax map identification number 5954-25-549980. ✓



SCHEDULE "B" – THE SURVEY

NOTES:

1. THE SURVEY IS SUBJECT TO ANY FINISHES OF A TITLE SEARCH.
2. SURFACE STRUCTURES AND UTILITIES NOT VISIBLE AT THE TIME OF SURVEY HAVE NOT BEEN SHOWN.
3. INTERFERENCES:
A. THE SURVEY WAS CONDUCTED IN THE PRESENCE OF THE FOLLOWING INTERFERENCES:
1. A BRIDGE STREET, CITY OF BEACON, SURVEYED AND PLATTED IN 1917 AS MAP NO. 1192, DUTCHESS COUNTY CLERK'S OFFICE ON FEBRUARY 25, 1917 AS MAP NO. 1192.
2. A BRIDGE STREET, CITY OF BEACON, SURVEYED AND PLATTED IN 1917 AS MAP NO. 1192, DUTCHESS COUNTY CLERK'S OFFICE ON FEBRUARY 25, 1917 AS MAP NO. 1192.
3. A BRIDGE STREET, CITY OF BEACON, SURVEYED AND PLATTED IN 1917 AS MAP NO. 1192, DUTCHESS COUNTY CLERK'S OFFICE ON FEBRUARY 25, 1917 AS MAP NO. 1192.
4. A BRIDGE STREET, CITY OF BEACON, SURVEYED AND PLATTED IN 1917 AS MAP NO. 1192, DUTCHESS COUNTY CLERK'S OFFICE ON FEBRUARY 25, 1917 AS MAP NO. 1192.
5. A BRIDGE STREET, CITY OF BEACON, SURVEYED AND PLATTED IN 1917 AS MAP NO. 1192, DUTCHESS COUNTY CLERK'S OFFICE ON FEBRUARY 25, 1917 AS MAP NO. 1192.
4. THE SURVEY IS FROM AN ACTUAL FIELD SURVEY COMPLETED ON MAY 20, 2019. CONTROLLER EVIDENCES ARE IN HAND OF DATA.
5. MAP BEARINGS AND NORTH IS BASED ON UTM 18N 12N OF DEGREE AT PAGE 225.



GRAPHIC SCALE



RECORD OWNER:
CITY OF BEACON
1 BEACON AVENUE
BEACON, NEW YORK 12208
TAX LOT: 3524 - 25 - 54822

LANC & TULLY
ENGINEERS AND SURVEYORS, P.C.
CORP. 2019, LANC & TULLY, P.C.
200 PARK AVENUE, 15TH FLOOR
NEW YORK, NY 10022
(212) 691-1700

SURVEY PREPARED FOR

**LOWER MAIN STREET
PUMP STATION**
CITY OF BEACON
DUTCHESS COUNTY, NEW YORK

CERTIFICATION:

I, **LANC & TULLY**, ENGINEERS AND SURVEYORS, P.C., DO HEREBY CERTIFY THAT THE SURVEY WAS CONDUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE ENGINEERING AND SURVEYING ACT, AND THAT THE RESULTS OF THE SURVEY ARE TRUE AND CORRECT.

LANC & TULLY
ENGINEERS AND SURVEYORS, P.C.
200 PARK AVENUE, 15TH FLOOR
NEW YORK, NY 10022
(212) 691-1700

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SCHEDULE "B-1" – METES AND BOUNDS DESCRIPTION

OF PUMP STATION AREA AND ACCESS AREA

PUMP STATION AREA

All that certain plot, piece or parcel of land, situate in the City of Beacon, County of Dutchess, State of New York, said lands being more particularly bounded and described as follows:

BEGINNING at a point marked by a rebar set in concrete being the northwesterly corner of lands now or formerly City of Beacon (Tax Lot 5954-25-566952);

THENCE running along a portion of the westerly line of lands of said City of Beacon, being a portion of the easterly line of lands herein described on the following two (2) courses and distances:

- (1) South 13 degrees, 10' 40" East, as per Liber 1931 of Deeds at Page 225, a distance of 32.36 feet; and
- (2) South 16 degrees, 31' 10" East, a distance of 4.09 feet, to a point being the southeasterly corner of lands herein described;

THENCE running through lands now or formerly Metropolitan Transportation Authority, being southerly, westerly, northerly and easterly lines of lands herein described on the following four (4) courses and distances:

- (3) South 85 degrees, 21' 49" West, a distance of 51.36 feet, to a point being the southwesterly corner of lands herein described;
- (4) North 04 degrees, 38' 11" West, a distance of 60.00 feet, to a point being the northwesterly corner of lands herein described;
- (5) North 85 degrees, 21' 49" East, a distance of 45.71 feet, to a point being the northeasterly corner of lands herein described; and
- (6) South 04 degrees, 38' 11" East, a distance of 24.00 feet, to the point or place of BEGINNING;

All as shown as a PUMP STATION AREA on a map entitled "Survey Prepared For Lower Main Street Pump Station, City of Beacon, Dutchess County, New York", dated May 23, 2019, last revised March 18, 2021, prepared by Lane & Tully Engineering and Surveying, P.C.

Containing 0.065± acres

Premises herein described being a portion of Tax Map Lot No. 549980, in Block 25, within Section 5954, as shown on the Tax Maps of the City of Beacon, Dutchess County, New York, dated 2018.

Premises herein described being a portion of the same premises as described in Liber 1931 of Deeds at Page 225, as filed in the Dutchess County Clerk's Office

Together with an ingress/egress access easement over lands now formerly Metropolitan Transportation Authority, being more particularly bounded and described as follows:

ACCESS AREA

BEGINNING at a point lying on the westerly line of lands now formerly City of Beacon being a northeasterly corner of lands herein described, said point being South 13 degrees, 10' 40" East, as per Liber 1931 of Deeds at Page 225 a distance of 32.36 feet, thence, South 16 degrees, 31, 10" East, a distance of 4.09 feet from a rebar in concrete being the northwesterly corner of lands of said City of Beacon;

THENCE running along a portion of the westerly line of lands of said City of Beacon being an easterly line of lands herein described;

(1) South 16 degrees, 31' 10" East, a distance of 9.43 feet, to a point being the southwesterly corner of lands of said City of Beacon;

THENCE running along a portion of the southerly line of lands of said City of Beacon being a northerly line of lands herein described,

(2) North 61 degrees, 12' 39" East, a distance of 13.26 feet, to a point being a northeasterly corner of lands herein described and a northwesterly corner of West Main Street;

THENCE running along a westerly line of said West Main Street, being the easterly line of lands herein described,

(3) South 39 degrees, 38' 31" East, a distance of 34.44 feet, to a point being the southeasterly corner of lands herein described and a southeasterly corner of lands now or formerly Metropolitan Transportation Authority;

THENCE running along a northerly line of West Main Street and continuing along a northerly line of lands now formerly Dedominicus and a portion of lands now or formerly Metropolitan Transportation Authority (Tax Lot 5954-25-563911), being the southerly line of lands herein described,

(4) South 71 degrees, 34' 59" West, a distance of 70.39 feet, to a point being the southwesterly corner of lands herein described;

THENCE running through lands of said Metropolitan Transportation Authority, being the westerly line of lands herein described,

(5) North 04 degrees, 38' 11" West, a distance of 48.78 feet, to a point being the northwesterly corner of lands herein described and lying on the southerly line of the previously described Pump Station Area;

THENCE running along a portion of the southerly line of lands of said Pump Station Area, being the northerly line of lands herein described,

(6) North 85 degrees, 21' 49" East, a distance of 34.56 feet, to the point or place of BEGINNING;

All as shown as an INGRESS/EGRESS ACCESS AREA on a map entitled "Survey Prepared For Lower MainStreet Pump Station, City of Beacon, Dutchess County, New York", dated May 23, 2019, last revised March 18, 2021 prepared by Lane & Tully Engineering and Surveying, P.C.

Containing 0.053± acres

Premises herein described being subject to any easements, rights-of-way, covenants or restrictions of record.

SCHEDULE "C"

Grant of Sewer Pump Station Utility Easement Agreement MTA/Grantor and City of Beacon /Grantee

SECTION A: INSURANCE REQUIREMENTS

I. Grantee's Insurance

The Grantee at its sole cost and expense shall carry and maintain policies of insurance at all times during the term of this Easement as set forth below:

1. **Workers' Compensation Insurance** as required by statute in the State in which the work will be performed. Employer's Liability Insurance with limits of not less than \$1,000,000 bodily injury per accident; \$1,000,000 bodily injury per disease; and \$1,000,000 annual aggregate. For work conducted outside the State of New York, Employer's Liability Insurance requires limits of not less than \$2,000,000 bodily injury per accident; \$2,000,000 bodily injury per disease; and \$2,000,000 annual aggregate and must provide proof that its Workers' Compensation Insurance policy has been endorsed to include "Other States Coverage".
 - If Grantee leases one or more employees through the use of a payroll, employee management, or other similar company, then Grantee must procure worker's compensation insurance written on an "if any" policy form, including an endorsement providing coverage for alternate employer/leased employee liability.
 - If the work will involve, in whole or in part, work or operations on the navigable waters of the United States or on a flagged vessel, then Grantee shall obtain coverage pursuant to the Jones Act and/or the Longshoremen's and Harbor Worker's Compensation Act as applicable.
2. **Commercial General Liability ("CGL") Insurance** covering claims for personal and advertising injury, bodily injury and property damage arising out of the Work and in a form providing coverage no less broad than that of ISO Commercial General Liability Insurance policy (Occurrence Form, number CG 00 01). Such insurance shall provide coverage for all operations including the products-completed operations hazard, and shall be maintained for a period of at least five (5) after Final Completion, subject to the limitation of any applicable statute. The limits of such insurance shall renew annually and not be less than:
 - a) \$2,000,000 each occurrence;
 - b) \$4,000,000 aggregate for products-completed operations;
 - c) \$4,000,000 general aggregate limit, which shall apply on a per project basis; and
 - d) Additionally:
 - Primary General Liability limits may be satisfied by Umbrella / Excess insurance;

- The policy shall not contain any contractual exclusion relative to Labor Laws or any other exclusions or limitations directed toward any types of projects, materials or processes involved in the Work.
 - The policy shall not contain any of the following exclusions: subcontractor's exclusion; construction defect exclusion; leased worker exclusion; cross liability exclusion; crane exclusion; and demolition exclusion or "explosion, collapse and underground" exclusion.
 - The policy shall include independent contractor and contractor liability coverages.
 - Construction work taking place within 50 feet of a railroad must include:
 - Contractual Liability – Railroads CG 24 17 listing the Scheduled Railroad and Designated Job Site.
 - Coverage for claims for bodily injury asserted by a railroad employee of an additional insured and any Employer's Liability Exclusion which may otherwise operate to exclude such coverage shall be removed.
3. **Business Automobile Liability Insurance** covering any owned, non-owned, and hired vehicles on and off-site for claims arising out of the ownership, maintenance or use of any such vehicle. Such insurance shall provide coverage not less than the standard ISO Comprehensive Automobile Liability policy (CA 00 01, CA 00 05, CA 00 12, CA 0020), with limits not less than \$2,000,000. If the work involves transportation of hazardous or regulated substances, hazardous or regulated wastes and/or hazardous or regulated materials, the Grantee shall provide pollution auto coverage equivalent to that provided under the ISO pollution liability-broadened coverage for covered autos endorsement (CA 99 48), and the Motor Carrier Act endorsement (MCS 90). Any statutorily required "No-Fault" benefits and uninsured/underinsured motorist coverage shall be included.
4. **Umbrella/Excess Liability Insurance** with limits not less than \$10,000,000 written on an occurrence basis in excess of the limits indicated for Commercial General Liability, Employer's Liability, and Business Automobile Liability Insurance identified above, and which is at least as broad as each and every one of the underlying policies. The umbrella/excess liability policies shall be written on a "drop-down" and "following form" basis, with only such exceptions expressly approved in writing by the Grantor. The Products Completed operations hazard shall be maintained for a period of at least five (5) after Final Completion, subject to the limitation of any applicable statute.
5. **Pollution Legal Liability Insurance** with limits not less than \$5,000,000 those on a per location basis and in the aggregate. Policy shall remain in effect until the one year anniversary of the termination or expiration of the Contract, unless such Policy is renewed or replaced with a substantially similar policy with an expiration date not earlier than such one year anniversary. The policy must be in form and substance acceptable to the Grantor and must at minimum, include the following coverage:

- a) O Intentionally omitted.
- b) On and Off-Site Cleanup of New Conditions;
- c) Third Party Claims for On and Off-Site Bodily Injury and Property Damage (Pre-existing and New Conditions);
- d) Non-Owned Disposal Site Liability;
- e) 3rd and 1st Party Transportation Liability;
- f) Defense including costs, charges and expenses incurred in the investigation, adjustment or defense of claims for such compensatory damages;

In addition:

- If the Policy has restrictions of coverage related to specific pollution conditions, the exclusion should be limited to remediation cost only, not bodily injury and property damage. Additionally, wording should be provided such that in the event of a "No Further Action Letter" or equivalent is issued, the carrier will consider modifying the exclusion or remove it in its entirety.
- The Policy shall have no exclusions for: (i) Indoor Air Quality conditions (e.g. Mold & Legionella), or (ii) bodily injury or property damage arising from Asbestos or Lead Based Paint.

6. Self-Insurance: Notwithstanding anything in this Agreement to the contrary, Grantee may elect not to carry insurance and to self-insure (or maintain any self-insured retention and/or deductible amount) as to the insurance coverage required above pursuant to any plan of self-insurance maintained by the Grantee. If Grantee elects to act as a self-insurer in lieu of procuring coverage from an insurance company, Grantee agrees that it will provide the same insurance coverage and protection for the benefit of the Grantor as an additional insured, in the same amount and under the same terms set forth above as it would provide to the Grantor if Grantee were to purchase commercial insurance from a third party insurer meeting the insurance coverage requirements set forth in this Section and name the Grantor as an additional insured thereunder. The Grantee further agrees that the limits of insurance set forth herein and any right to self-insure, or self-insured retention and/or deductible amounts shall not be construed as limiting or expanding the indemnification, hold harmless and rights to defense provisions of Section 12 hereof. The Grantee's option to self-insure does not extend to any Contractor the Grantee may hire for the work to be performed under this Agreement. Contractors hired by the Grantee must adhere to all insurance terms and conditions as set forth herein.

II. Insurance during construction, installation, or repair work

The Grantee or its Contractor at its sole cost and expense shall carry and maintain policies of insurance at all times during the period of performance under this Easement as set forth below:

1. **Workers' Compensation Insurance** as required by statute in the State in which the work will be performed. Employer's Liability Insurance with limits of not less than \$1,000,000 bodily injury per accident; \$1,000,000 bodily injury per disease; and \$1,000,000 annual aggregate. For work conducted outside the State of New York, Employer's Liability Insurance requires limits of not less than \$2,000,000 bodily injury per accident; \$2,000,000 bodily injury per disease; and \$2,000,000 annual aggregate and must provide proof that its Workers' Compensation Insurance policy has been endorsed to include "Other States Coverage".
 - If Grantee or Contractor leases one or more employees through the use of a payroll, employee management, or other similar company, then Grantee or Contractor must procure worker's compensation insurance written on an "if any" policy form, including an endorsement providing coverage for alternate employer/leased employee liability.
 - If the work will involve, in whole or in part, work or operations on the navigable waters of the United States or on a flagged vessel, then Grantee or Contractor shall obtain coverage pursuant to the Jones Act and/or the Longshoremen's and Harbor Worker's Compensation Act as applicable.
2. **Commercial General Liability ("CGL") Insurance** covering claims for personal and advertising injury, bodily injury and property damage arising out of the Work and in a form providing coverage no less broad than that of ISO Commercial General Liability Insurance policy (Occurrence Form, number CG 00 01). Such insurance shall provide coverage for all operations including the products-completed operations hazard, and shall be maintained for a period of at least five (5) after Final Completion, subject to the limitation of any applicable statute. The limits of such insurance shall renew annually and not be less than:
 - a) \$2,000,000 each occurrence;
 - b) \$4,000,000 aggregate for products-completed operations;
 - c) \$4,000,000 general aggregate limit, which shall apply on a per project basis; and
 - d) Additionally:
 - Primary General Liability limits may be satisfied by Umbrella / Excess insurance;
 - The policy shall not contain any contractual exclusion relative to Labor Laws or any other exclusions or limitations directed toward any types of projects, materials or processes involved in the Work.
 - The policy shall not contain any of the following exclusions: subcontractor's exclusion; construction defect exclusion; leased worker exclusion; cross

liability exclusion; crane exclusion; and demolition exclusion or "explosion, collapse and underground" exclusion.

- The policy shall include independent contractor and contractor liability coverages.
- Construction work taking place within 50 feet of a railroad must include:
 - Contractual Liability – Railroads CG 24 17 listing the Scheduled Railroad and Designated Job Site.
 - Coverage for claims for bodily injury asserted by a railroad employee of an additional insured and any Employer's Liability Exclusion which may otherwise operate to exclude such coverage shall be removed.

3. **Business Automobile Liability Insurance** covering any owned, non-owned, and hired vehicles on and off-site for claims arising out of the ownership, maintenance or use of any such vehicle. Such insurance shall provide coverage not less than the standard ISO Comprehensive Automobile Liability policy (CA 00 01, CA 00 05, CA 00 12, CA 0020), with limits not less than \$2,000,000. If the work involves transportation of hazardous or regulated substances, hazardous or regulated wastes and/or hazardous or regulated materials, the Grantee shall provide pollution auto coverage equivalent to that provided under the ISO pollution liability-broadened coverage for covered autos endorsement (CA 99 48), and the Motor Carrier Act endorsement (MCS 90). Any statutorily required "No-Fault" benefits and uninsured/underinsured motorist coverage shall be included.
4. **Umbrella/Excess Liability Insurance** with limits not less than \$10,000,000 written on an occurrence basis in excess of the limits indicated for Commercial General Liability, Employer's Liability, and Business Automobile Liability Insurance identified above, and which is at least as broad as each and every one of the underlying policies. The umbrella/excess liability policies shall be written on a "drop-down" and "following form" basis, with only such exceptions expressly approved in writing by the Grantor. The Products Completed operations hazard shall be maintained for a period of at least five (5) after Final Completion, subject to the limitation of any applicable statute.
5. **Contractor's Pollution Liability Insurance** with limits not less than \$5,000,000 per occurrence and general aggregate on a per project basis including completed operations coverage to be maintained for at least three (3) years after final completion of the work. Policy shall cover environmental damage resulting from pollution conditions that arise from the operations of the contractor or subcontractor, as applicable, and described under the scope of services of this contract. Coverage must apply to sudden and non-sudden pollution conditions including the discharge, dispersal, release or escape of smoke, vapors, soot, fumes, acids, alkalis, toxic chemicals, liquids or gases, waste materials or other irritants, contaminants or pollutants, silt or sediment into or upon land, the atmosphere or any watercourse or body of water, provided such conditions are not naturally present in the environment in the concentration or amounts discovered, unless such natural condition(s) are

released or dispersed as a result of the performance of Covered Operations. Such insurance shall include but not be limited to:

- Bodily injury, sickness, disease, mental anguish or shock sustained by any person, including death; medical monitoring;
 - Physical injury to or destruction of tangible property of parties other than the Insured including the resulting loss of use and diminution in value thereof; Loss of use, but not diminution in value, of tangible property of parties other than the Insured that has not been physically injured or destroyed;
 - Natural Resource Damages;
 - Cleanup Costs
 - Transportation and Non-Owned Disposal Site coverage (with no sunset clause/restricted coverage term) if Contractor or subcontractor is disposing of contaminated material (s);
 - No exclusions for asbestos, lead paint, silica or mold/fungus/legionella;
 - Defense including costs, charges and expenses incurred in the investigation, adjustment or defense of claims for such compensatory damages.
6. **Builder's Risk / Installation Floater** "all-risk" policy form, written on a primary replacement cost basis and completed value form in an amount equal to the total contract costs (unless a lesser amount equal to the total amount of construction (direct or "hard" costs) is required by Grantor. Policy shall include, without limitation, terrorism coverage, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, mold, glass breakage, malicious mischief, collapse, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, increased cost of construction, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

This insurance shall cover any and all real and personal property owned (including owner provided material, equipment and cost of owners dedicated project support labor), used or intended for use or hereafter created, installed or acquired, including while in the course of building, erection, installation and assembly. Coverage for flood and earthquake shall include all below and above ground structures, water and sewer mains. The policy shall also include coverage for materials, equipment, machinery and supplies of any nature whatsoever, used or intended for use or hereafter created, installed or acquired provided such property is intended to be permanently located in or on the building or structures as more fully described in the construction contract. Sub-limits are subject to advance written approval by Grantor. The Contractor shall be the First Named Insured, Subcontractors of all tiers as Insureds, and the Grantor as Additional Named Insured. All premium considerations are the sole responsibility of the First Named Insured/Contractor. Builder's Risk insurance shall be maintained until construction is completed and accepted, unless otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance.

Subcontractors' temporary structures, tools, equipment and other materials not to become a permanent part of the completed structure are excluded from coverage. The Grantor shall not be responsible for such loss, theft, or disappearance of tools or equipment. The Grantor shall have the full power to adjust and settle all losses and claims under the Builder's Risk insurance policy provided Grantor shall collaborate with the Contractor regarding losses that are Costs of the Work. The Grantor shall be listed as loss payee.

The Contractor is responsible for all deductibles under this insurance. Deductible amount shall not exceed \$500,000 except with the express permission of the Grantor and are assumed by the First Named Insured / Contractor. Said policy shall not contain a Coinsurance Provision.

The policy shall expressly provide coverage but, not be limited to the following:

- This insurance shall cover materials and equipment stored off site and while in transit. The minimum limit of insurance shall be equal to the maximum storage value at the largest storage location considering the value of all material or equipment located at the off- site storage location. A separate limit shall be applicable to material and equipment while in transit which represents the maximum value of the material or equipment in any one transit conveyance;
- Coverage for natural disasters such as flood, windstorm, and earth movement (including but not limited to earthquake, landslide, earth sinking, rising or shifting, volcanic eruption, explosion or effusion and all naturally occurring or due to man-made or other artificial causes);
- Damage to Grantor existing property or property leased to the Grantor or property while in the care, custody and control of the Grantor - covering damage to useable existing property if resulting from a peril insured against and emanating from the work performed by the insured contractor(s);
- Beneficial Occupancy - The policy must permit partial or beneficial occupancy prior to the final acceptance of the work;
- Contractors Expediting Expense and Extra Expense;
- Policy coverage extensions are to be provided addressing Changes in Law, Ordinance or Regulation and Increase Cost of Construction;
- The policy shall provide coverage for resultant damage including amendment of exclusions (if necessary) pertaining to error in design, plans and or faulty workmanship;
- Loss Valuation - Coverage shall be provided on a "Replacement Cost" basis with a policy modification to cover all cost to repair or replace the structure or work

(including overhead and profits) and based on replacement cost calculations at the 'time of repair or replacement';

- Debris Removal equal to a minimum sum insured representing 25% of the replacement cost of the project;
- Equipment Breakdown Coverage / Hot testing coverage shall be included in the policy providing coverage during installation and testing operations including but not limited to performance testing of any machinery, equipment, electrical apparatus, traction power systems, signal systems and associated controls etc., where applicable; and
- For Design Build contracts, policy shall include the coverage extension – London Engineering Group – Improvement Consequences – aka – “LEG-3” -3/96.

Evidence of Builder's Risk/Installation Floater Insurance requires submission of the policy and approval is conditioned upon Grantor review of the final policy form. Pending issuance of the policy, a temporary binder can be provided to Grantor in advance of the start of construction and allowing sufficient time to review the documents for coverage content. The binder for insurance must be replaced with an actual policy within 45 days of the policy inception. The Contractor will provide a copy of all endorsements issued on an ongoing basis.

7. **Railroad Protective Liability Insurance** (ISO-RIMA or equivalent form) if any work will be taking place within 50 feet of a railroad, subway or similar tracked conveyance or requires flag or protective measures by the Grantor or its affiliates or their respective employees, covering the work to be performed at the designated job site and affording protection for damages arising out of bodily injury or death, physical damage to or destruction of property, including damage to the Insured's own property and conforming to the following:

- The policy shall be issued to the “Named Insureds” listed under Section B.
- The limit of liability shall be not less than \$2,000,000 per occurrence, subject to a \$6,000,000 annual aggregate;
- Policy must be endorsed to provide coverage for claims arising from injury to employees covered by Federal Employer's Liability Act (FELA), when applicable.
- Indicate the Name and address of the designated Contractor, location of the Work the Contract description and Contract Number, if applicable.

SECTION B: INDEMNITEES (ADDITIONAL INSUREDS/NAMED INSUREDS)

Metropolitan Transportation Authority (MTA) and the respective affiliates and subsidiaries existing currently or in the future of and successors.

Additional Indemnitees required when work is performed at the location(s) below:

HUDSON LINE: Midtown TDR Ventures, LLC & Midtown Trackage Ventures LLC, Argent Ventures LLC, State of Connecticut and Connecticut Department of Transportation (CDOT), National Railroad Passenger Corp (AMTRAK), CSX Transportation, Inc. & New York Central Lines, LLC, and Delaware & Hudson Railway Company Inc. (D&H), LAZ Parking New York/New Jersey, LLC (where applicable) and the respective affiliates and subsidiaries existing currently or in the future of and successors to each Indemnified Parties listed herein.

SECTION C: GENERAL INSURANCE REQUIREMENTS

The following requirements are applicable to all insurance coverages required under this Agreement, except to the extent otherwise indicated.

1. **Insurer Requirements.** All policies of insurance shall be placed with insurers acceptable to the Grantor. The insurance underwriter(s) must be duly licensed or approved Surplus Lines insurer to do business in the state where the Work is to be performed and must have a financial rating of A-/VII or better in the most recent edition of Best's Key Rating Guide or otherwise satisfactory to the Grantor.
2. **Right to Request Additional Insurance.** The Grantee further agrees to provide, at Grantee's sole cost and expense, such increased or expanded insurance coverage as Grantor may from time to time as deem appropriate. The Grantor at intervals of no less than five years may require that the limits of insurance required under Section A be raised to such amounts as shall reasonably necessary and commercially available to protect the Grantor.
3. **Additional Insureds.** *Except with regard to Workers' Compensation and Professional liability insurance (unless otherwise noted), all insurance required under Section A shall name the parties listed in Section B as Additional Insureds,* and shall include their respective subsidiary and affiliated companies, and their Boards of Directors, officers, employees, representatives, and agents (hereinafter, collectively the "Additional Insureds"). For the Commercial General Liability insurance, additional insured status must be provided on ISO forms or their equivalent at least as broad as CG 00 01 04 13 for non-construction agreements. However, agreements involving construction, additional insured status must be provided on ISO forms or their equivalent at least as broad as CG 20 10 and CG 20 37 – alternatively CG 20 38 and CG 20 37.
4. **Primary and Non-Contributory.** Each policy required in Section A, including primary, excess, and/or umbrella, shall provide that the insurance provided to the Additional Insureds is primary and non-contributory, such that no other insurance or self-insured retention carried or held by the Grantor shall be called upon to contribute to a loss covered by insurance for the named insured.

5. **Waiver of Subrogation.** To the fullest extent permitted by law, Grantee will require all insurance policies required by this Section to include clauses stating each insurer will waive all rights of recovery. All waivers provided herein shall be effective as to any individual or entity even if such individual or entity (a) would otherwise have a duty of indemnification, contractual or otherwise, or (b) did not pay the insurance premium directly or indirectly, and whether or not such individual or entity has an insurable interest in any property damaged.
6. **Self-Insured Retentions.** None of the insurance required of this Section A shall be subject to any self-insured retention greater than \$500,000 without the Grantor written approval.
7. **Subcontract Agreements.** The Grantee shall by appropriate written agreements flow down the requirements for i) the waiver of subrogation for all required insurance, and ii) additional insured coverage for all required insurance and iii) other requirements of this Section to all tiers of contractors and subcontractors, for all insurance required of such contractors and subcontractors by the Grantee for the Work.
8. **No Limitation.** Nothing in this Section shall be construed as limiting in any way the extent to which the Grantee may be held responsible for payment of damages resulting from their operations. The Grantee's obligations to procure insurance are separate and independent of, and shall not limit the Grantee's contractual indemnity and defense obligations. Grantor does not represent that coverages and limits required in this Agreement will necessarily be adequate to protect the Grantee.
9. **Notice of Cancellation or Non-Renewal.** The Grantee agrees to notify Grantor thirty days prior to any cancellation, non-renewal or change to any insurance policies required in Section A.
10. **Notice of Occurrence.** The Grantee shall immediately file with the MTA Legal Department (with a copy to the Project Manager), 2 Broadway -4th Floor, New York, 10004, a notice of any occurrence likely to result in a claim against the MTA, and shall also file with the Law Department detailed sworn proof of interest and loss with the claim. This paragraph shall survive the expiration or earlier termination of this Easement.
11. **Insurance Not in Effect.** If, at any time during the period of this Easement, insurance as required is not in effect, or proof thereof is not provided to the Grantor, the Grantor shall have the options to: (i) direct the Grantee to suspend work or operation with no additional cost or extension of time due on account thereof; or (ii) treat such failure as a default hereunder.
12. **Conformance to Law.** If applicable law limits the enforceability of any of the foregoing requirements, then Grantee shall be required to comply with the foregoing requirements to the fullest extent of coverage and limits allowed by

applicable law and the provisions of insurance shall be limited only to the extent required to conform to applicable law.

13. Certificates of Insurance

- a) The Grantee shall furnish Grantor with Certificates of Insurance ("COI") utilizing ACORD 25 and 101 and ACORD 855 (for NY Construction Projects Only), completed by a duly authorized representative evidencing coverage required under Section A. Such Certificates of Insurance shall be delivered to the Grantor before any Work hereunder is commenced by the Grantee and annually thereafter on or before the policy effective dates of the Grantee's policies based on the instructions stated herein.

Evidence of Railroad Protective Liability Insurance and Builder's Risk/Installation Floater Insurance requires submission of a policy and is not acceptable on a certificate of insurance. A binder is acceptable pending issuance of the policy. The binder must indicate the agreement number, description and location of Work and the designated Contractor and must be signed by the authorized producer or insurance carrier.

- b) Insurance Confirmation. In addition to the foregoing certificates of insurance, the Grantee or its insurance broker shall submit a copy of the following endorsements with reference to: the agreement number, description and location of Work and designated contractor, where applicable.
- Additional Insured endorsements specifically naming the Indemnitees listed in Section B.
 - Primary and non-contributory endorsement(s) naming the Indemnitees listed in Section B.
 - Waiver of Subrogation endorsements in favor of the Indemnitees listed in Section B.
 - Other coverage endorsements may be requested depending on the Scope of Work to be performed by the Grantee, Contractor or its subcontractor.

14. **Insurance Policies.** The Grantee shall furnish certified copies of all insurance policies required to be maintained under this Agreement within ten (10) business days after receiving the Grantor's request therefor.

15. **Submission of Insurance.** The Grantee and its Contractor shall submit evidence of insurance prior to the start of any work to Grantor as follows:

- **Initial Insurance:**

Metropolitan Transportation Authority
C/o MTA Real Estate Department
2 Broadway – 4th Floor
New York, NY 10004

- **Renewal Certificates:**

Greystone Corporate Realty Service
505 Eighth Avenue – Suite 300
New York, NY 10018
Attention: Heather Iocolano

16. **Renewal Insurance.** Grantee shall endeavor to provide evidence of renewal or replacement policies of insurance, with terms and limits no less favorable than the expiring policies at least two (2) weeks prior to the expiration of the policies.
17. Failure of the Grantor to demand such COIs or other evidence of full compliance with these insurance requirements, or failure of Grantor to identify a deficiency from evidence provided, will not be construed as a waiver of the Contractor's obligation to maintain such insurance. Grantor acceptance of any COI evidencing the required coverages and limits does not constitute approval or agreement by Grantor that the insurance requirements have been met or that the insurance policies shown in the COI are in compliance with the requirements.
18. Grantor has the right, but not the obligation, of prohibiting Grantee from entering the Project Site until Grantor receives all COIs or other evidence that insurance has been placed in complete compliance with these requirements.

SCHEDULE "D"
CONTRACTOR'S INDEMNITY LETTER

INSURANCE AND INDEMNITY AGREEMENT

In consideration of being permitted to enter upon the property of Metropolitan Transportation Authority ("Grantor") located at _____ (the "Property"), on _____ 2020, in furtherance of the business or other activities of the City of Beacon ("Grantee") with respect to Grantee's installation of a sewer pump station, which include the performance of certain work by the undersigned (the "Work") on or about a portion of the Property designated as the "Easement Area", pursuant to that certain Easement dated _____ 2020, from Grantor to Grantee, as the same may be amended, extended and/or re-issued from time to time (the "Easement"), the undersigned contractor, subcontractor, agent or representative of Grantee, is executing this Insurance and Indemnification Agreement (this "Agreement"), for itself and its successors and assigns:

1. Easement. The undersigned hereby acknowledges and agrees that it (a) has been provided with a copy of the Easement and has reviewed the terms thereof, (b) is bound by the Easement insofar as it relates to the undersigned's entry upon, access to and conduct of activities on or about the Property and the Easement Area, all of which are subject to the terms and conditions of the Easement, and (c) will comply with all of the requirements set forth in the Easement (including, without limitation, the requirement to maintain and replenish a force account) relating to the performance of the Work, entry upon, access to and conduct of activities on or about the Easement Area.
2. INSURANCE. Prior to its entry upon the Property, the undersigned shall deliver to Grantor (a) certificates of insurance (using forms ACORD 25 and ACORD 855 NY) certifying that the undersigned maintains the insurance coverages required to be maintained by a contractor or subcontractor of Grantee under the terms of the Easement, and (b) an additional insured endorsement to the undersigned's commercial general liability insurance policy (I.S.O. Form CG 20-38) naming Grantor (and its subsidiaries and affiliates), and the State of New York, and their respective successors and assigns (collectively, the "Additional Insureds"), as additional insureds under such commercial general liability insurance policy.
3. INDEMNIFICATION. To the fullest extent permitted by law, the undersigned shall at all times indemnify, protect, defend the Additional Insureds and each of their respective officers, directors, commissioners, agents and employees and any other persons acting on their behalf (individually, an "Indemnitee" and, collectively, the "Indemnities; being and intended to be the same parties as identified individually as an "Indemnified Party" in the Easement and collectively as the "Indemnified Parties" in the Easement) (with counsel reasonably approved by Grantor) and save harmless each from and against any and all losses (to property, materials, and equipment or otherwise), damages, detriments, suits, claims, fines, judgments, injuries, penalties, demands, costs, charges and expenses, including but not limited to reasonable attorneys' fees and disbursements, and including but not limited to any claims or judgments under the Workers Compensation Law of the State of New York or the Federal Employees Liability Act or similar statutes for the protection of employees or any other judgments whatsoever, which any or all of

the Indemnitees may directly or indirectly suffer, sustain or be subjected to arising in whole or in part, directly or indirectly, by reason of or in connection with the undersigned's or its contractors or subcontractors or its or their employees, agents, consultants, licensees or invitee's, or other person acting on its or their behalf, entry upon, or use of the Property or the Permitted Area, or the activities or Work thereon, or the conduct thereon of the undersigned or its contractors or subcontractors or its or their employees, agents, consultants, licensees or invitee's, or other person acting on its or their behalf, whether such loss or damage be suffered or sustained by any or all of the Indemnitees directly or by other persons (including employees of any or all of the Indemnitees or corporations who may seek to hold any or all of the Indemnitees liable therefor), and whether attributable, in whole or in part, directly or indirectly, to the fault, failure or negligence of any or all of the Indemnitees.

4. SURVIVAL. The indemnification obligations of the undersigned as set forth in this Agreement shall survive the completion of the Work by the undersigned for a period of three (3) months after completion of all Work; provided, however, that the indemnification obligations of the undersigned as set forth in this Agreement shall remain in effect with respect to events that arose before the completion of the Work even if the action in question is not commenced until after the expiration of such three (3) month period..

5. AUTHORITY. The undersigned represents and warrants that the person executing this Agreement on behalf of the undersigned is fully authorized to execute this Agreement and to bind itself and its successors and assigns.

Date: _____

[Name:]

[Signature:] _____

[Address:] _____

Attention:

[Telephone:] _____

Exhibit A

GENERAL PROCEDURE FOR ACCESS TO RAILROAD PROPERTY

All outside parties who need to perform construction or maintenance on or adjacent to Metro-North Railroad property must comply with the following:

1. Permit Application:

Parties requiring an entry permit shall submit a written request to the Chief Maintenance of Way Officer defining the location, scope of work and duration of activities on or adjacent to Railroad facilities. Address the letter to:

Chief Maintenance of Way Officer
Attention: Richard Webster
Assistant Director
MTA Metro-North Railroad
420 Lexington Avenue, 10th Floor
New York, NY 10017
Tel: (212) 499-4533

Execute and return the Entry Permit provided by Metro-North to the Chief Maintenance of Way Officer. Applicant shall obtain confirmation of receipt from the Chief Maintenance of Way Officer.

2. Insurance:

Furnish proof of insurance in a form acceptable to and approved by the Director of MTA Risk and Insurance Management no less than 20 working days prior to the intended start of work (see Insurance Specifications, attached separately) to:

Chief Maintenance of Way Officer
Attention: Richard Webster
Assistant Director
MTA Metro-North Railroad
420 Lexington Avenue, 10th Floor
New York, NY 10017
Tel: (212) 499-4533

Applicant shall obtain confirmation of receipt and approval of the insurance certificate from the Director of MTA Risk and Insurance Management.

3. Payment:

Upon review of the scope of work provided with the permit application, Metro-North will prepare an estimate of the cost of providing Railroad Protective Personnel and all other expenses related to the project. Supply payment, in full, of Metro-North's estimated cost of Railroad Force Account Services no less than 20 working days prior to the intended start of work. Obtain confirmation of receipt by Richard Webster. Since the payment is based on an

estimated cost, unexpended funds if any, will be subject to reimbursement. On the contrary, should the actual work exceed the estimated cost, an additional payment shall be submitted to continue Railroad Force Account Services. Make Check Payable to MTA Metro-North Railroad

4. **Technical Submittals:**

Supply construction shop drawings, calculations and supporting documentation in accordance with the attached "Construction Management I & C Specifications". Address them to and receive confirmation of receipt by:

Chief Maintenance of Way Officer
Attention: Richard Webster
Assistant Director
MTA Metro-North Railroad
420 Lexington Avenue, 10th Floor
New York, NY 10017
Tel: (212) 499-4533

Once Metro-North has received all submittals plus all supporting documents allow 15 working days from date of receipt for Metro-North's review of the submittals prior to requesting a conference to schedule that activity.

When the above requirements have been satisfied, contact the Assistant Director of Construction Management no less than 15 working days prior to the start of work to schedule a pre-construction conference at (212) 499-4462. When all is in order, the Construction Management Department will schedule Railroad coordination and support services. (See Sections A and B of "Construction Management I & C Specifications"). No work will commence until the applicant receives permission from the designated Railroad Representative at the site to proceed with the work.

(Rev 6/10/09)



Metro-North Railroad

CONSTRUCTION MANAGEMENT SPECIFICATIONS FOR INDIVIDUALS & COMPANIES (I & C) WORKING ON OR ADJACENT RAILROAD PROPERTY

Section A & B

(Revised 6/10/09)

SECTION A

SPONSOR REQUIREMENTS FOR WORK AFFECTING THE RAILROAD

Introduction:

Metro-North is a commuter Railroad serving New York and Connecticut areas North of Manhattan. Construction and Maintenance activities shall not interfere with the safe and scheduled movement or operation of the trains. No construction activities will occur during Operating hours unless allowed by the Field Inspector. There are conditions unique to this operating railroad environment which Metro-North must consider when planning construction activities. Among these are: high voltage third rail and power transmission systems, high speed and silent trains that require long braking distances, buried signal control and communication systems and many more. Metro-North must have absolute cooperation of any sponsor planning construction activities that could interfere with train operations.

The sponsor is the agency or party who has a formal agreement with Metro-North to perform construction or maintenance around the railroad. The sponsor of the project is ultimately responsible for assuring that its agents, consultants, contractors and sub-contractors fully comply with the specifications contained herein. The term "sponsor" used throughout these specifications shall mean the sponsor, its employees, its agents, consultants, contractors, sub-contractors, etc.

The sponsor shall safeguard the tracks, rolling stock and other equipment and plant of the Railroad from being damaged in any manner and will be held financially responsible for it. He shall not perform any activities around the Railroad until he has executed a formal agreement and complied with Metro-North requirements.

Fouling:

An operating track will be considered fouled when, in the sole opinion of Metro-North, demolition, blasting or construction activity on or adjacent to a main track or controlled siding may interfere with the safe movement of trains at normal speed. A crane, derrick or a similar piece of equipment located on Metro-North right-of-way or on adjacent property shall be considered as fouling the track when the position in which it is working is such that without regard to the manner in which it is intended to carry out the operation, failure or malfunction could cause damage or obstruction within the operating area. Similarly, Metro-North utilities (power, communications and signal lines) will be considered fouled when, in the sole opinion of Metro-North, the sponsor's operation could damage or interfere with these utility lines.

Track Use:

Metro-North will, at its sole discretion, remove tracks from service and de-activate high voltage traction power facilities to permit certain construction activities that can only be performed at times when Metro-North can schedule this track use. **In general, Metro-North can de-activate single tracks at night between the hours of 2:30AM and 5:00AM.** Construction activities that require de-activating all tracks of a main line system must be performed on weekend nights at times specified by Metro-North. Requests for additional "track use" will be evaluated subject to operating and maintenance priorities. Requests to de-activate track(s) and/or high voltage power systems must be received in writing, faxed to 212 340 2573 and acknowledged by phone to the assigned Metro-North Inspector no less than 14 days prior to the scheduled activity. Metro-North will only consider requests for "track time" to facilitate construction activities that have been approved by the Construction Management I & C Department.

Protective Personnel:

Metro-North will furnish flagmen, inspectors, maintenance personnel and similar labor (protective personnel) as required by Metro-North to protect the operation of train traffic during the sponsor's construction activities. The sponsor must obey the instructions from Metro-North flagmen or other representatives on the job site promptly. Failure to follow instructions from Metro-North personnel on the site will lead to withdrawal of Metro-North's entry permit, thus closing the job site to the sponsor and its employees. Metro-North will, at its sole discretion, determine the need for and the availability of protective support personnel. The sponsor must notify in writing, faxed to 212 340 2573 and acknowledged by phone to the assigned Metro-North inspector no less than 14 calendar days in advance of undertaking an approved construction activity that may require protective personnel. If the sponsor notifies Metro-North less than 14 days in advance, Metro-North may be unable to supply protective personnel and/or Metro-North may incur additional costs in accordance with existing collective bargaining agreements in order to fulfill a request. The cost of protective personnel and any additional penalty costs incurred by Metro-North due to late notification shall be borne by the sponsor. Requests to cancel construction activities and protective personnel must be received and acknowledged by the assigned Metro-North inspector no less than 96 hours (4 days) prior to the start of the scheduled construction activity. Any costs incurred by Metro-North due to late cancellation notice shall be borne by the sponsor. Metro-North will provide protective forces to the extent possible considering operational and maintenance priorities. Metro-North makes no guarantee that protective personnel will be available to meet the sponsor's preferred schedule. Further, no such work may actually

commence until the assigned Metro-North representative affirmatively advises the sponsor that the necessary protective forces are stationed and that he may proceed.

MNR Representation:

All matters requiring Metro-North approval or coordination of construction activities shall be directed to the following:

Assistant Director – Construction Management – I&C Department
Metro-North Commuter Railroad Company
525 North Broadway
White Plains, NY 10603.
914-461-0443
Ramkeesoon@mnr.org

Preparation:

The sponsor shall obtain written approval of design and construction methods from Metro-North. The sponsor shall submit detailed plans, appurtenant data and calculations prepared by a Professional Engineer licensed in the state where the work will be performed for any operation on or adjacent to Metro-North property prior to the start of work. Metro-North will evaluate the effect of this work on the operating Railroad. The plan shall locate and identify all utilities above and below ground at the work site. The sponsor shall make necessary plan revisions, schedule changes, additions, deletions, etc., at his/her own expense. The sponsor shall remove at his/her own expense any pipe, wire or structural facility installed without Metro-North approval or which deviates from the plan approved by Metro-North.

Under the direction of a Metro-North representative (engineer, inspector) the sponsor shall – at no cost to Metro-North – perform pre and post construction surveys of tracks and structures to establish existing horizontal and vertical clearances. Vertical clearance shall be measured from "top of rail". Horizontal clearance shall be measured from the "centerline of track". The elevations shall reference an established survey benchmark that will remain undisturbed throughout the construction. It may be necessary for the sponsor to monitor movements of tracks and structures on a more frequent basis – monthly, weekly or daily as determined by the Metro-North representative. Copies of the field notes must be delivered to Metro-North on the date the survey was performed.

The sponsor shall obtain appropriate soils/foundation data prepared by a licensed Professional Engineer. The licensed Professional must perform an analysis and supply recommendations wherever the project requires excavations, shoring, pipe jacking, borings, dewatering and temporary foundation supports, or any other subsurface construction activities.

Under the direction of a Metro-North representative (engineer, inspector) the sponsor shall – at no cost to Metro-North – take pre and post construction photographs of the entire work site and track area, two sets of which will be delivered to Metro-North. The photographs shall be gloss prints 8 ins. by 10 inches in size or submitted on disc with photos in jpg format. They shall also be labeled on their reverse sides. The label shall include project title, Project Identification Number (PIN), Bridge Identification Number (BIN) or contract number, name of sponsor, date and direction photograph was taken. Each photograph shall also be numbered for identification.

Submittals:

All submittals requiring review and approval by Metro-North shall first be reviewed by the sponsor's designated Consulting Engineer and then submitted to Metro-North to complete the review and approval process. Submittals shall be stamped or written as "Approved", "Approved As Noted", "Revise and Resubmit", or "Rejected" by the sponsor's designated consulting engineer at the conclusion of the review prior to its submission to Metro-North.

Environmental Controls:

The sponsor shall comply with any and all Federal, State and Local laws, regulations and rules governing environmentally controlled substances and construction practices. He shall submit a plan and procedure prepared by a Professional Engineer licensed in the state where the work will be performed for handling and disposal of regulated materials. De-watering operations shall comply with applicable regulatory controls and shall be subject to Metro-North review and approval. The sponsor shall comply with Federal and State regulations for containment, storage and disposal of hazardous/industrial wastes. He shall comply with Metro-North Procedure 50-601, Item "O", Environmental Controls. The sponsor shall indemnify and hold harmless Metro-North from any loss, liability or expense on account of claims which result from the handling, transportation, disposal or abatement of asbestos, asbestos-containing material or asbestos-contaminated materials, lead paint materials, polychlorinated biphenols (PCB's) and other environmentally regulated substances and materials in the possession of sponsor or his subcontractors.

Drainage/Wetlands/Storm Water Protection:

Metro-North is a non-traditional Municipal Separate Storm Sewer System (MS4). The sponsor must submit a Storm Water Pollution Prevention Plan (SWP3) for their project if it will result in the disturbance of surface areas and/or the creation of new impervious surfaces. The SWP3 must include temporary sedimentation and erosion control measures (both a narrative description of the measures and a site diagram), as well as appropriate post-construction storm water protection measures (narrative description and design drawing) if the project will result in any new impervious area. The sponsor will be responsible for inspection and maintenance of sedimentation and erosion control measures during construction, and responsible for payment to Metro-North for any ongoing maintenance required for post-construction storm water protection measures.

The sponsor will be responsible for identifying and delineating any and all wetlands in the area covered by the Entry Permit and/or in any area which could be impacted by the sponsor's project. The sponsor will be responsible for obtaining any permits required solely in their name as permittee. The sponsor shall promptly provide Metro-North with copies of all identification/delineation documents and reports as well as permit applications and permits in both draft and final form.

The sponsor shall indemnify and hold harmless Metro-North from any loss, liability or expense on account of claims that result from a failure to implement or maintain adequate storm water protection measures or a failure to obtain or comply with necessary regulatory permits.

Contractor must protect ballast and keep free from soil, concrete, slurry and other contaminants. Contractor must supply a method for the protection of the ballast. The Contractor/Sponsor is

financially responsible for the replacement of contaminated ballast. The replacement of the ballast is performed by Metro-North's Track & Structures Department.

Security:

The sponsor shall adhere to Metro-North security practices. He shall identify all sponsor/subcontractor personnel who have reason to enter a designated security area of Metro-North property. He shall supply a listing of the names of all personnel who have reason to enter Metro-North property. The list shall be updated on a daily basis.

When working in Grand Central Terminal (GCT) the Sponsor shall submit a list of all the personnel working at the site to the Stations Master's Office (SMO) at the beginning of the shift. The list must include work location, date and work period. At the end of every work shift the competent person on site must notify the SMO that work has ended and everyone has left the work site.

Safety:

Metro-North conducts a mandatory safety orientation class for all sponsor personnel who enter upon or works adjacent to Metro-North's property. Seven (7) working days advance notice is necessary for class scheduling. Sponsor personnel must present proof of completion of this orientation before entering the property. Sponsor personnel who fail to carry proof of training shall be removed from the property.

The sponsor shall comply with the requirements of all applicable Federal, State, Local and Metro-North jurisdictions to provide a suitable work environment for workmen and for the general public. Sponsor shall prepare and submit a comprehensive Safety Plan which will: Designate a company Representative(s) who will prepare and implement a program of compliance. The Sponsor must supply personal protective equipment for all workmen employed by the sponsor or his contractors and enforce use of this equipment by contract personnel. The sponsor shall supply Material Safety Data sheets for construction or maintenance materials that pose a safety, fire, health or other hazard to Metro-North.

Protective Enclosures:

The sponsor will not store materials or equipment upon the Railroad right-of-way without first obtaining written permission and approval of Metro-North. The sponsor shall secure construction materials and equipment that could be used by vandals to obstruct Railroad operations in a vandal-proof enclosure. The sponsor shall be responsible to protect the work site with fences, barricades, barriers, watchmen or other means necessary to bar access to operating areas via the work site. Fences at a minimum shall be 12-gauge chain link, eight (8) feet in height. Vehicular barriers shall comply with "AASHTO" Standard for design and fastening to structures.

English Language:

The sponsor must furnish an English-speaking supervisor at each job location who is capable of communicating (including translating if necessary) instructions from the flagman or other Metro-North representative to the sponsor's personnel on the job. Such supervisor must remain on the site at all times while work is being performed or any sponsor employees are on or about the Metro-North right-of-way.

Blasting:

Is prohibited on Metro-North's property. Metro-North shall determine if any blasting in the vicinity of the railroad will affect its operations. The sponsor shall submit to Metro-North for approval, plans and specifications of any proposed controlled blasting activities that could affect railroad operations.

Hi-Rail Equipment:

Highway-rail mounted equipment and "work trains" are generally prohibited from use by non-Railroad agencies on Metro-North mainline tracks.

Temporary Structures:

Shall be necessary at the sole discretion of Metro-North to protect the Railroad or the general public from possible falling debris, paint or other materials, to protect personnel working above the right-of-way, to provide a platform for personnel, materials, and/or equipment and to provide a walkway for the general public. Temporary structures intended as walkways for the general public shall comply with the "New York State Building Code" Specifications and the Americans with Disabilities Act of 1991.

Temporary Stairways or pedestrian walkways must be fully enclosed to protect from precipitation.

A protective scaffold intended to contain finely broken concrete decking shall be designed for a live load of 200 lbs. per square foot applied uniformly over the entire structure, and a 2 kip concentrated load placed anywhere on the structure. The two loads are not to be applied simultaneously for design purposes. Design of the scaffold intended for any other purpose shall be submitted to Metro-North for approval. The design shall contain details of any construction activities supported or protected by the scaffold. Impact loads or rigging that exceed the capacity of the scaffold shall be subject to the conditions of Section B "Rigging". Wood for protective scaffolding must be fire-retardant. The sponsor must supply Metro-North with certification from the manufacturer or supplier that lumber meets or exceeds the ASTM E-84 fire-retardant specification for exterior application 30-minute duration. Plans and calculations for temporary structures must be submitted to Metro-North for review and approval prior to construction. Further, plans and calculations must be prepared and stamped by a Professional Engineer licensed in the state in which the project is located.

Shoring:

All drawings for temporary sheeting and shoring shall be prepared and stamped by a Registered Professional Engineer (licensed in the state in which the project is located) and shall be accompanied by complete design computations with supporting soils and groundwater information when submitted for approval.

Sheeting shall be required on all excavations where the side of the excavation is intercepted by the Railroad live load influence line. The live load influence line is defined as a line originating at the top of tie and extending out in this plane a distance of 10 feet, then downward at a slope of 1 (vertical) on 1½ (horizontal). Such excavations must be designed to withstand, in addition to all static loads such as structural dead load, soil pressure and hydrostatic pressure, a Railroad live

load of Cooper E-80 as defined in the "AREMA Manual Section 1-3" or other loading magnitude as may be directed by Metro-North. (See drawing "SK - 1", APPENDIX A).

Interlocking steel sheet piling, driven prior to excavation, must be used to protect track stability.

The use of trench boxes or similar devices is not acceptable in this area. Soldier piling and lagging will be considered for supporting adjacent track(s) only when its use is approved by Metro-North. Consideration for use of soldier piling and lagging will be made if the required penetration of steel sheet piling cannot be obtained and when dry, non-running, stable material will be encountered.

Lateral forces acting on the sheeting shall be computed as follows:

The active earth pressure due to the weight of the soil shall be computed by the Rankine Theory. The Boussinesq analysis shall be used to determine the lateral pressure caused by the railroad loading. The load on the track shall be taken as a strip load with a width equal to the length of the ties (8' - 6"). The vertical surcharge, q (psf), caused by each axle weight divided by the tie length and the axle spacing (5' - 0"). For an E-80 loading:

$$q = 80,000 \text{ lbs.} / (8.5' \times 5') = 1882 \text{ psf.}$$

The horizontal pressure due to the live load surcharge at any point on the sheet piling wall is P_h and can be calculated by the following:

$$P_h = (2q / \pi) (\beta - \sin \beta \cos 2\alpha)$$

(See drawing "SK - 2", APPENDIX B).

The allowable stresses for the sheet piling and other steel members (wales, struts, etc.) shall be in accordance with AREMA Chapter 15, Parts 1 and 2. These allowable stresses may be increased ten percent (10%) due to the temporary nature of the installations.

Where soil or rock anchors are used, all anchors must be tested. Testing shall be in accordance with industry standards with ten percent (10%) of the anchors "Performance Tested" and all others "Proof tested".

Cavities adjacent to the sheet piling, created by the driving of the sheet piling, shall be filled with 1½-inch stone ballast. Any disturbed ballast must be restored and tamped immediately. This task is performed by Metro-North's Track & Structures department the cost of which is borne by the sponsor.

Sheet piling shall be cut off at the top of tie during construction. After construction and backfilling has been completed, piling shall be cut off eighteen (18) inches below the existing ground line and left in place.

Moreover, sheeting alongside active track systems shall maintain lateral support. Lateral support shall maintain a compacted stone ballast shoulder level with the top of tie for at least two (2) feet from the end of tie supported by a slope no steeper than one (1) vertical to two (2) horizontal.

Any excavation adjacent to track shall be covered and ramped and provided with barricades as required by Metro-North. A lighted walkway with a handrail must be provided adjacent to the track for any excavation within twenty (20) feet of the centerline.

Under the direction of a Metro-North representative (Engineer or Inspector) the sponsor shall – at no cost to the railroad- perform pre and post construction surveys of tracks and structures to establish existing horizontal and vertical clearances. Vertical clearances shall be measured from Top of Rail. Horizontal clearances shall be measured from the Center Line of Track. The elevations shall reference an established benchmark that will remain undisturbed throughout the construction. It may be necessary for the sponsor to monitor movements of tracks and structures on a more frequent basis – daily or weekly, monthly or as determined by the Metro-North Representative. Copies of the filed notes must be delivered to Metro-north on the date the survey was performed.

Final backfilling of the excavation shall be as required by Metro-North.

SECTION B

REQUIREMENT FOR ERECTION, DEMOLITION, AND OTHER RIGGING OPERATIONS OVER OR ADJACENT TO METRO-NORTH RIGHT-OF-WAY

The sponsor must furnish scaled plans with supporting calculations in order to obtain written approval prior to the start of any rigging operation over or adjacent to the Metro-North right-of-way. Submittals for bridge erection, demolition, or other hoisting operations shall be prepared and stamped by a Registered Professional Engineer and must include the following:

1. Plan view showing locations of crane or cranes, operating radii, with delivery and disposal locations.
2. Crane rating sheets showing cranes to be adequate for 150% of the lift. Indicate Crane and boom nomenclature.
3. Plans and computations showing weight of picks. Include catalog with weight of equipment to be lifted and manufacturer's shipping weights.
4. Show in a table format on the plan a "Crane Lifting Schedule" of each crane pick as shown below:

CRANE LIFTING SCHEDULE								
Piece No.	Piece Weight kips	Rigging Weight kips	Block Weight kips	Maximum Weight kips	Maximum Radius feet	Boom Length Feet	Crane Capacity kips	Safety Factor 150 %
1	X	X	X	X	Y	Y	X	Z

5. Computations and plans demonstrating that MNR's train shed structure can bear load of crane with equipment load.
6. Computations and plans demonstrating that soils or foundations for equipment and temporary structures are adequate and able to protect subsurface utilities and structures.
7. Check condition of steel in trainshed (Grand Central Terminal) to ascertain whether steel needs to be blocked or posted.
8. Plans and calculations showing locations and structural adequacy of mats, barges, embankments, supporting structures, planking, or special decking as required by Metro-North.
9. Location profiles indicating the proposed swing in relation to obstructions such as overhead wires and structures.
10. Data sheet listing type and size of slings or other connecting equipment. Include copies of catalog cuts or information sheets of specialized equipment. The method of attachment must be detailed on the erection plan. All lifting components must be adequate for 150% of the lift.
11. A complete procedure indicating the order of lifts and any repositioning or re-hitching of the crane or cranes.
12. Plans detailing temporary support of any components or intermediate stages.
13. A time schedule (by hour and day) of the various stages, as well as a schedule for the entire lifting procedure.
14. Written statement from crane owner of last crane safety inspection with a copy of current inspection certificate.
15. Mark the exact crane location in the field at least two working days prior to the intended operation. Also, certify the stability of the foundation for crane outriggers and supports.
16. Conduct survey/mark out of streets or yards (North of 97th street) to determine whether manholes or duct banks can bear outrigger loads.

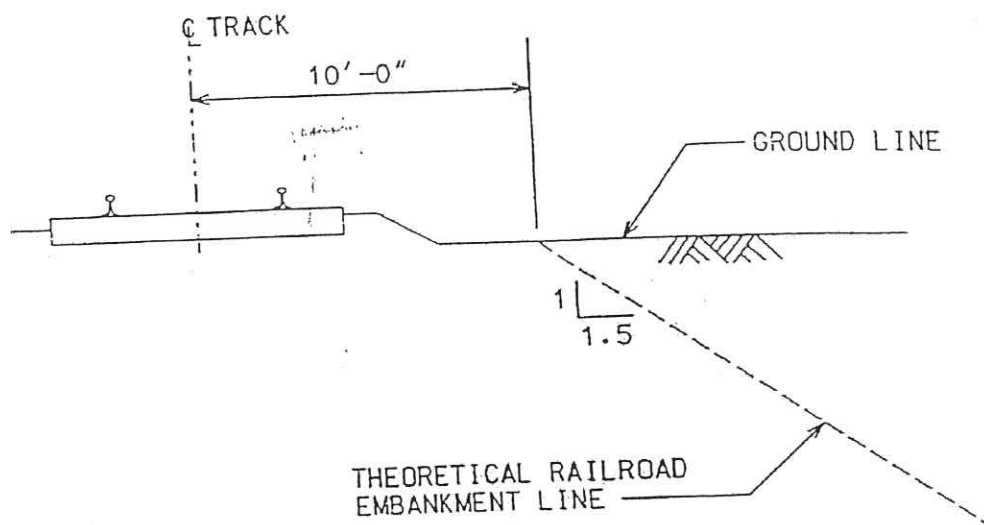
In general, unless otherwise directed by Metro-North, operations directly over or adjacent to the operating right-of-way which fouls the operating area, or which in the event of a failure could fall across the operating area will be performed between approximately 2:30 AM and 5:00 AM.

Operations involving a track and power outage across all tracks may be performed at times specified by Metro-North.

Any deviation from this plan must be reviewed and approved by the sponsor's engineer prior to resubmission to the Metro-North Engineer for review and approval prior to the date that the work will be scheduled.

APPENDIX A

DWG. SK - 1
(2/18/00)



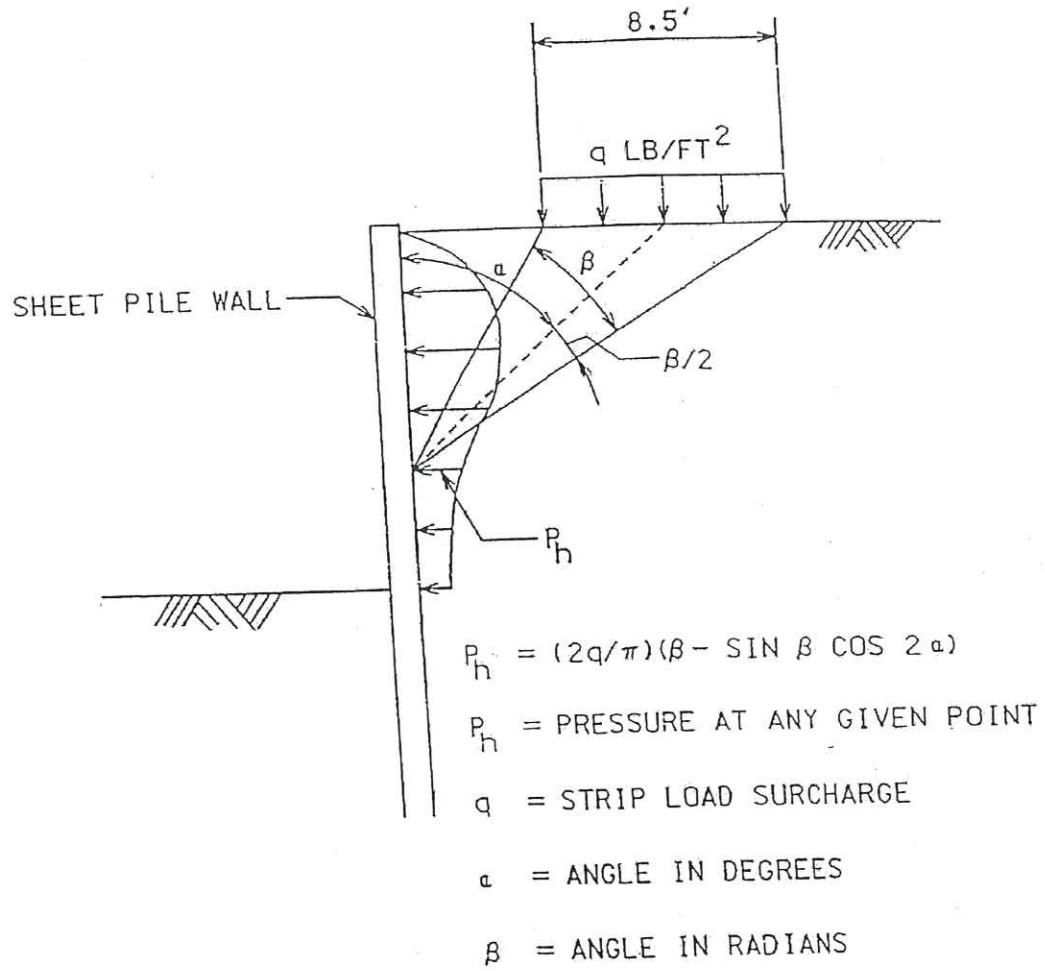
REQUIREMENTS FOR TEMPORARY SHEET PILING ADJACENT TO TRACK

1. STEEL SHEET PILING FOR TRACK SUPPORT IS NOT REQUIRED FOR EXCAVATION OUTSIDE THE THEORETICAL RAILROAD EMBANKMENT LINE. SHORING IN ACCORDANCE WITH OSHA REQUIREMENTS SHALL BE USED IN THIS AREA.
2. STEEL SHEET PILING, DRIVEN PRIOR TO EXCAVATION, IS REQUIRED WHEN EXCAVATION IS WITHIN THE THEORETICAL RAILROAD EMBANKMENT LINE.
3. ALL SHEET PILING IS TO BE DESIGNED FOR AN E-80 LOADING. THE BOUSSINESQ ANALYSIS IS TO BE USED TO DETERMINE THE LATERAL PRESSURE CAUSED BY THE RAILROAD LOADING.

APPENDIX B

DWG. SK - 2
(2/18/00)

LATERAL PRESSURE DIAGRAM



LATERAL PRESSURE DUE TO STRIP LOAD

Exhibit B

STANDARD FORMAT FOR ARCHITECTURAL DRAWING SUBMISSIONS METRO-NORTH CONCESSIONS

Before construction or rehabilitation can begin, licensees must submit plans prepared by a licensed architect or engineer to the MTA for approval. After review by the MTA, plans will be returned to the licensee either "Approved for Construction" or "Disapproved" with comments to guide the preparation of a revised submission. The format for revisions must conform to the guidelines set forth below.

Initial Submission

- Format - Blue or black line prints on a white background. The preferred drawing size is 24" x 36".
- Copies - five (5) copies are to be submitted.
- Location Plan - The first page of the submission must include a key map or location plan of the premises. In many cases, the MTA can provide a station map or other map to accurately locate the premises.
- Architectural Plans - Floor plans, reflected ceiling plans, storefront elevations, sections, and working drawings must include:
 - dimensions,
 - materials of construction,
 - details of fixtures,
 - swing of doors,
 - details of rolling shutters,
 - details of signage, and
 - all other information relating to the premises and the area around it.
- Plumbing Plans - The layout and details of plumbing must show the following:
 - an equipment schedule,

- Plumbing Plans - The layout and details of plumbing must show the following:
 - an equipment schedule,
 - details of connections to existing lines,
 - interior plumbing layout, and
 - sizes and materials for all plumbing lines, drains, and equipment.
- Electrical Plans - the layout and details of all electrical equipment must be shown, including details of Con Edison service connections, panel layouts, wire and conduit sizes, and the details of all electrical equipment.
- Telephone Plans - The layout and details of telephone connections must be shown.
- Fire Protection Plans - The layout and details of sprinklers or other automatic fire protection devices must be shown, including details of connections to existing lines. In those instances where the Metro-North's requirements for fire protection devices differ from Code, the Metro-North's requirements shall prevail.

Revisions

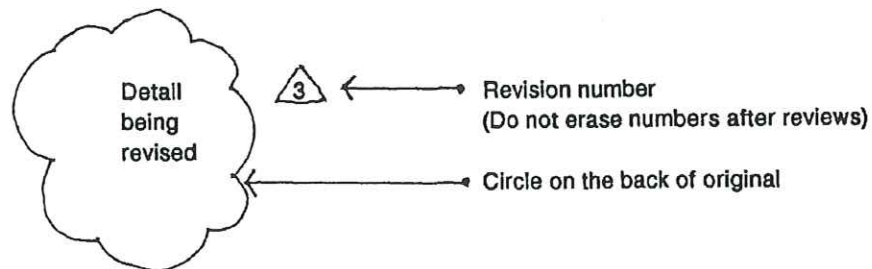
To avoid confusion as to which revision is being submitted for review, the following format must be used in all revisions:

- A revision box in reverse order (from the bottom up) should be drawn near the title box of each sheet. The revision box should consist of three columns: revision number, item being revised, and revision date.

④	POWER FEED DIAGRAM, D A/C SUPPORT, E	09-10-93
③	SPRINKLER LAYOUT, B SIGNAGE LAYOUT, 2	08-23-93
②	ELEVATION DIAGRAM, 3 ELEVATION, 4	08-02-93
①	STOREFRONT, B	07-08-93

* A circle should be drawn around each detail being revised. Triangles with revision numbers $\triangle 2 \triangle 3$ ect. should be marked next to each applicable circle.

* With each subsequent submission, all previous circles (which are to be marked on the back side of the mylar) are to be erased. However, revision numbers should remain.



* Any revision not presented in the required format will not be considered an official submission and will not be reviewed. Please contact the MTA if additional information is required.

ENVIRONMENTAL REPORT

Limited Phase II Environmental Site Assessment

Location:

MTA Property – Proposed Easement
Railroad Drive, City of Beacon, Dutchess County, New York

Prepared for:

City of Beacon
1 Municipal Plaza
Beacon, New York 12508

LaBella Project No. CZ42022 (2222030)

May 24, 2022



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- 1 Site Location Map
- 2 Boring Location Map

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- 1 Soil Laboratory Analytical Results Summary
- 2 Groundwater Analytical Results Summary

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- A Laboratory Analytical Report
- B NYSDEC Spill Closure
- C Email from Waste Management of NY



1.0 INTRODUCTION

LaBella Associates, D.P.C. (“LaBella”) was retained by the City of Beacon, New York, to conduct a Limited Phase II Environmental Site Assessment (ESA) at the Metropolitan Transportation Authority (MTA) Property located on Railroad Drive in the City of Beacon, Dutchess County, New York, hereinafter referred to as the “Site” (see Figure 1). This Limited Phase II ESA has been performed consistent with the scope and limitations of The Chazen Companies (now LaBella Associates) proposal dated June 29, 2020.

The Site is a (\pm)0.065-acre area of land that includes part of a sign, a maintained lawn, and overgrown land. The Site is part of a 3.38-acre parent property that is used as a parking lot for the nearby MTA train station.

Objective

The purpose for this Limited Phase II ESA was to investigate the following significant data gaps (SDGs) identified in Chazen’s June 16, 2020, Phase I ESA to assess whether a recognized environmental condition (REC) exists:

1. There is a lack of information regarding the condition of soil in relation to the former railroad features in the general areas of the Site.
2. There is a lack of information regarding the condition of the subsurface in relation to current and former off-Site uses.

Based on the Objective, the Limited Phase II ESA included a LaBella environmental professional observing geotechnical borings by GZA GeoEnvironmental Inc. (GZA) of Norwood, MA, screening of soils for evidence of contamination, and preparation of soil and groundwater samples for laboratory analysis.

1.1 Special Terms & Conditions

The findings of this Limited Phase II ESA are based on the scope of work and project objectives as stated in The Chazen Companies’ (now LaBella Associate DPC) Professional Services Change Order dated June 29, 2020.

1.2 Limitations & Exceptions

Work associated with this Limited Phase II ESA was performed in accordance with generally accepted environmental engineering and environmental contracting practices for this region. LaBella Associates, D.P.C., makes no other warranty or representation, either expressed or implied, nor is one intended to be included as part of its services, proposals, contracts, or reports.

Phase II ESAs are screening level assessments to assess specific potential environmental concerns identified at a site from the Phase I ESA and are not an exhaustive assessment of environmental conditions on a property. The Phase II ESA is not intended to delineate the nature and extent of contamination at the Site, nor address complex geological settings, the fate and transport characteristics of certain hazardous substances. physical limitations imposed by the location of utilities and other man-made objects, and the limitations of assessment technologies



In addition, LaBella cannot provide guarantees, certifications, or warranties that the property is or is not free of environmental impairment or other regulated solid wastes. The Client shall be aware that the data and representative samples from any given soil sampling point or monitoring well may represent conditions that apply only at that particular location, and such conditions may not necessarily apply to the general Site as a whole.

2.0 FIELD INVESTIGATION

The following Scope of Work was performed:

2.1 Geotechnical Soil Boring Installation, Field Observations, and Sampling

On March 30 and March 31, 2022, six (6) geotechnical soil borings were advanced at the Site by Craig Geotechnical Drilling Co., Inc., of Parlin, New Jersey, under supervision of GZA personnel. The boring plan was provided to LaBella in the field and we used GZA's boring designations of B-1 through B-6, for consistency. Geotechnical borings were advanced to depths ranging from approximately 6 to 20 feet (ft) below ground surface (bgs) into bedrock with a CME® 55LC rubber track-mounted drill rig. The CME advanced a 2-inch diameter split-spoon sampler in approximately 2-foot sections. The split-spoon sampler was decontaminated between boring locations using an Alconox detergent and potable water solution followed by a potable water rinse. Geotechnical soil boring locations are depicted on **Figure 2**.

Soil samples were collected continuously from the ground surface to the bottom of each boring. Soil samples were visually and physically examined by LaBella personnel and observations made of the general lithology, visible layering, evidence of nonnative fill/historic fill materials, indications of chemical or other staining, odors, and other distinctive features. Soils from each boring were field screened for the presence of volatile organic compounds (VOCs) using a photoionization detector (PID) equipped with a 10.6 electronvolt (eV) lamp.

Soils at the Site consisted generally of urban fill, silt, and weathered bedrock overlaying competent bedrock. Urban fill consisted mostly of silt with sands, little gravel, and trace coal fragments and cinders. Bedrock at the Site appeared to range from 6-feet below ground surface (ft. bgs) B-5 to 10-ft bgs (B-2). No staining, odors, PID readings greater than 0.0 parts per million (ppm), or other evidence of impacts was noted in the geotechnical borings.

Samples were selected from two depth intervals at borings B-3 and B-5 for laboratory analysis to address the SDGs identified at the Site. The name for each soil sample incorporates the boring number and sample depth (in ft bgs). Soil samples B-3(1-2ft) and B-5(1-2ft) were collected to assess shallow soils for potential impacts from the former railroad track (SDG 1). Soil sample B-3(8-9ft) was collected from the groundwater interface, and B-5(3-4ft) was collected from the bottom of the soil boring that was terminated prior to encountering groundwater.

2.2 Groundwater Sampling and Observations

One (1) geotechnical soil boring (B-3) was converted into a temporary groundwater sampling point (TGSP) on March 30, 2022. The TGSP was completed with 5 ft of 0.010-inch slot well screen of 1-inch inner diameter Schedule 40 polyvinyl chloride (PVC) attached to solid riser piping of the same material. The TGSP was installed to intersect the apparent top of the groundwater table, as observed in the soil cores.

The TGSP and details of their installation are presented below.



TGSP/Boring ID	Depth of Well (ft bgs)	Screen Length (feet)	Screen Interval (ft bgs)	Water Level (ft bgs)
B-3	10.05	5	5 to 10	7.40

Groundwater in B-3 was purged dry via disposable bailer on March 30, 2022, so a grab groundwater sample was collected on March 31, 2022, using a battery-operated peristaltic pump with a low flow. Water quality parameters were not collected, and turbidity was assessed visually and generally ranged from slight to moderate in terms of turbidity. No sheen, odor or other evidence of petroleum or chemical impacts was noted during groundwater sample collection from this TGSP. Following sample collection, the TGSP was pulled, and the borehole backfilled with soil cuttings to grade.

2.3 Laboratory Analytical Program

Soil and groundwater samples selected for analysis were placed directly into laboratory-supplied containers, preserved as appropriate in a cooler, submitted to York Analytical Laboratories, Inc., which is a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP) certified laboratory under chain-of-custody protocol. A laboratory courier was utilized to transport the samples to the lab from LaBella's Poughkeepsie, New York office.

Samples were submitted for analysis of New York State Department of Environmental Conservation (NYSDEC) petroleum range (CP-51 List) volatile organic VOCs for shallow soil samples and NYSDEC Full List VOCs for subsurface soil samples and groundwater sample by United States Environmental Protection Agency (USEPA) method 8260, NYSDEC Full List semi-volatile organic compounds (SVOCs) by USEPA method 8270, Resource Conservation and Recovery Act (RCRA) metals (total and dissolved in groundwater sample) by USEPA methods 6010 and 7471, and polychlorinated biphenyls (PCBs) by USEPA method 8082.

The laboratory analytical report is included as **Appendix A**.

3.0 ANALYTICAL RESULTS

3.1 Laboratory Analytical Results Comparison

The laboratory analytical results were compared to the following standards, criteria, and guidance (SCGs) for New York.

Soil SCGs

- NYSDEC Commissioner Policy Soil Cleanup Levels (CP-51 SCLs)
- NYSDEC Brownfield Cleanup Program Part 375-6 Soil Cleanup Objectives (SCOs)

Groundwater SCGs

- TOGS 1.1.1 - NYSDEC document titled "Division of Water Technical and Operational Guidance Series 1.1.1; Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations" dated June 1998 as amended with April 2000 and June 2004 addendum tables.

The attached **Table 1** presents the Soil Laboratory Analytical Results Summary and attached **Table 2** presents the Groundwater Laboratory Analytical Results Summary.



3.2 Soil Sample Results

VOCs:

Trace concentrations of one VOC, Methylene Chloride were detected at soil boring location B-3 from 8 to 9 ft. bgs and B-5 from 3 to 4 ft. bgs. Concentrations detected were less than applicable SCGs. The reported low level concentrations of methylene chloride (less than 0.075 milligrams per kilogram (mg/kg)) in soil samples are likely attributable to laboratory contamination and not considered a site contaminant. VOCs in other soil samples were not detected above laboratory MDLs.

SVOCs:

Trace concentrations of SVOCs were detected in the soil samples but were less than applicable SCGs.

Metals:

The following metals were detected in soil samples at concentrations greater than their respective Unrestricted Use SCOs (UUSCOs):

- B-3 from 8 to 9-ft. bgs reported a lead concentration (65.4 mg/kg) and mercury concentration (0.56 mg/kg) greater than their UUSCOs (63 mg/kg and 0.18 mg/kg, respectively). As a point of reference, both concentrations are less than their Residential Use SCOs
- B-5 from 3 to 4-ft. bgs reported a lead concentration (79.4 mg/kg) slightly greater than its UUSCO (63 mg/kg).

PCBs:

PCBs in soil samples were not detected above laboratory MDLs.

3.3 Groundwater Sample Results

VOCs:

Trace concentrations of VOCs, Acetone and Toluene were detected in the B-3 sample at concentrations detected less than applicable SCGs. Other VOCs were not detected above laboratory MDLs in the groundwater sample.

SVOCs:

Several SVOCs including but not limited to polyaromatic hydrocarbons (PAHs) Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, and Indeno(1,2,3-cd)pyrene were detected in the B-3 groundwater sample slightly greater than the SCGs. While an exceedance of the SCGs is considered reportable to NYSDEC, who assigned Spill #2200295 to the spill, the observed elevated turbidity in this sample is considered to be the reason for the elevated concentrations of PAHs, and these detections do not appear to be representative of dissolved concentrations in groundwater (refer to Section 4.0).

Metals (total and dissolved)

Trace concentrations of select metals were detected in the B-3 groundwater sample, but concentrations of both total and dissolved metals were less than applicable comparison criteria.

PCBs:

PCBs in the groundwater sample were not detected above laboratory MDLs.



4.0 FINDINGS AND CONCLUSIONS

LaBella was retained by the City of Beacon, New York, to conduct a Limited Phase II ESA at the Metropolitan Transportation Authority (MTA) Property located on Railroad Drive in the City of Beacon, Dutchess County, New York. The Limited Phase II ESA consisted of included a LaBella environmental professional observing geotechnical borings by GZA GeoEnvironmental Inc. (GZA) of Norwood, MA, screening of soils for evidence of contamination, and preparation of soil and groundwater samples for laboratory analysis.

Based on the completion of this investigation, the following findings were made:

- Laboratory analysis of soil and groundwater samples did not identify elevated concentrations of targeted VOCs, PCBs, or SVOCs, with the exception of select PAHs (a category of SVOCs) in the groundwater sample collected from B-3, on the southern portion of the Site. However, based on the lack of elevated PID readings or suspect odors or staining combined with the elevated turbidity observed during the collection of this sample, the detections of PAHs in this groundwater sample do not appear to be representative of dissolved concentrations in groundwater but a “false-positive” due to the presence of sediment in the turbid grab groundwater sample. This information was conveyed to the New York State Department of Environmental Conservation regarding Spill #2200295 and the Case Manager Meagan Lenna responded via email that spill was being closed. NYSDEC’s online database shows that the spill was closed on April 29, 2022, and a print up of the online record is provided as **Appendix B**.
- The presence of metals (lead and mercury) in subsurface samples at concentrations that exceed Unrestricted Use SCOs do not appear to present a direct contact risk under existing conditions, nor are the concentrations considered likely to require remediation by New York State Department of Environmental Conservation.

5.0 RECOMMENDATIONS

Based on the findings of this Limited Phase II ESA, LaBella offers the following recommendations for soil and groundwater during planned construction:

- The grab groundwater sample indicates that turbidity caused the elevated PAH concentrations. LaBella concurs with the presented plan to allow dewatering fluids to be pumped into a silt sock, or similar, to allow for turbidity reduction before being pumped into the City’s sanitary sewer system at the adjoining pump station.
- The limited lead and mercury concentrations indicate that soil cannot be used as off-site as clean fill, and the contractors should be informed of the identified constituent concentrations. If taken off-site, soil should be characterized and disposed of properly at a landfill. If reused on-site, it should be placed in a similar depth as its source (i.e., not used as surface soil). We understand that construction will include removal of some bedrock beneath the water table. As sampling data were collected to assess for evidence of specific analytes from off-Site sources, that screening is not generally sufficient to assess for off-Site disposal and additional sampling is likely required depending on the planned disposal facility. LaBella communicated with Waste Management of NY (WMNY), who represents the Green Ridge disposal facility in Gansevoort, Saratoga County, NY. WMNY has reviewed the provided data and indicated that



the existing analytical data should be sufficient to accept the estimated 300 cubic yards of soil without further waste characterization, and the email communication is provided in **Appendix C**.

6.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS

Report Prepared By:

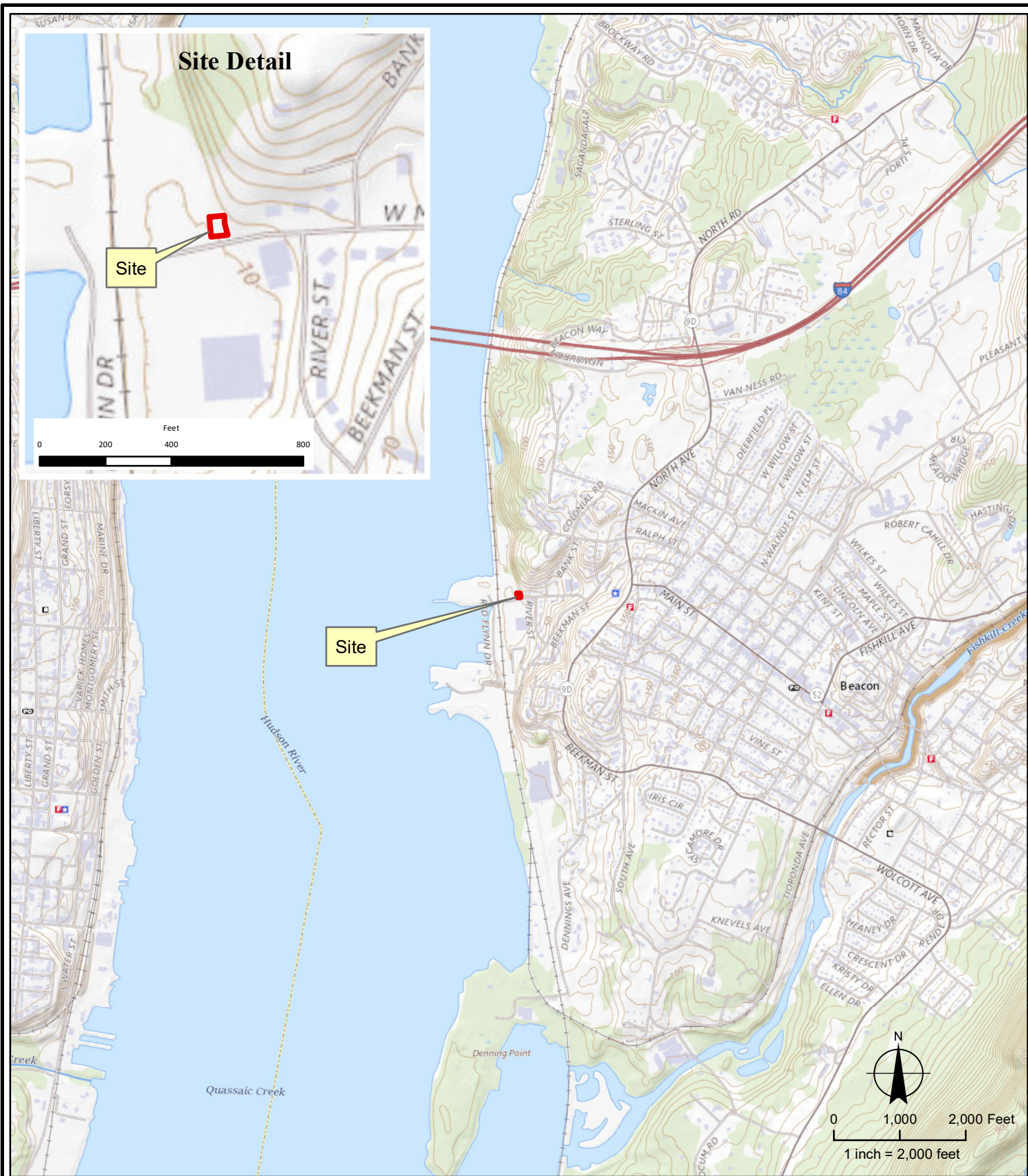
Branson Fields
Environmental Scientist

Report Reviewed By:

Arlette St. Romain
Brownfields Program Manager



FIGURES



Site Location Map

FIGURE 1

City of Beacon, New York

MTA Property - Proposed Easement
Railroad Drive, City of Beacon, Dutchess County, New York

Limited Phase II Environmental Site Assessment



LaBella Project No: CZ42022
Date: April 2022



**Boring Location
Map**

FIGURE 2

City of Beacon, New York
 MTA Property - Proposed Easement
 Railroad Drive, City of Beacon, Dutchess County, New York
 Limited Phase II Environmental Site Assessment

LaBella
 Powered by partnership.

LaBella Project No: CZ42022
 Date: April 2022



TABLES

Table 1
Limited Phase II Environmental Site Assessment
MTA Property - Railroad Drive, City of Beacon, NY
Soil Laboratory Analytical Results Summary
LaBella Project No. 2222030

Sample ID (depth, ft. bgs)	ownfield Cleanup Program Part 375-6 Soil Cleanup Objectives				B-3 (1-2 ft)		B-3 (8-9 ft)		B-5 (1-2 ft)		B-5 (3-4 ft)	
Sampling Date/Time	CP/SCO Table 2- Gasoline	CP/SCO Table 3-Fuel Oil	Unrestricted Use	Residential Use	3/30/2022 13:00		3/30/2022 13:10		3/30/2022 14:15		3/30/2022 14:30	
Compound					Result	Q	Result	Q	Result	Q	Result	Q
Volatile Organic Compounds (VOCs), CP-51 Low level												
Dilution Factor					1				1			
1,2,4-Trimethylbenzene	3.6	3.6	3.6	47	ND		NT		ND		NT	
1,3,5-Trimethylbenzene	8.4	8.4	8.4	47	ND		NT		ND		NT	
Benzene	0.06	0.06	0.06	2.9	ND		NT		ND		NT	
Ethyl Benzene	1	1	1	30	ND		NT		ND		NT	
Isopropylbenzene	2.3	2.3	~	~	ND		NT		ND		NT	
Methyl tert-butyl ether (MTB	0.93	~	0.93	62	ND		NT		ND		NT	
Naphthalene	12	12	12	100	ND		NT		ND		NT	
n-Butylbenzene	12	12	12	100	ND		NT		ND		NT	
n-Propylbenzene	3.9	3.9	3.9	100	ND		NT		ND		NT	
o-Xylene	0.26	0.26	0.26	100	ND		NT		ND		NT	
p- & m- Xylenes					ND		NT		ND		NT	
p-Isopropyltoluene	10	10	~	~	ND		NT		ND		NT	
sec-Butylbenzene	11	11	11	100	ND		NT		ND		NT	
tert-Butylbenzene	5.9	5.9	5.9	100	ND		NT		ND		NT	
Toluene	0.7	0.7	0.7	100	ND		NT		ND		NT	
Xylenes, Total	0.26	0.26	0.26	100	ND		NT		ND		NT	
Volatile Organic Compounds (VOCs), NYSDEC Part 375 List												
Dilution Factor							1				1	
1,1,1-Trichloroethane	~	~	0.68	100	NT		ND		NT		ND	
1,1-Dichloroethane	~	~	0.27	19	NT		ND		NT		ND	
1,1-Dichloroethylene	~	~	0.33	100	NT		ND		NT		ND	
1,2,4-Trimethylbenzene	3.6	3.6	3.6	47	NT		ND		NT		ND	
1,2-Dichlorobenzene	~	~	1.1	100	NT		ND		NT		ND	
1,2-Dichloroethane	~	~	0.02	2.3	NT		ND		NT		ND	
1,3,5-Trimethylbenzene	8.4	8.4	8.4	47	NT		ND		NT		ND	
1,3-Dichlorobenzene	~	~	2.4	17	NT		ND		NT		ND	
1,4-Dichlorobenzene	~	~	1.8	9.8	NT		ND		NT		ND	
1,4-Dioxane	~	~	0.1	9.8	NT		ND		NT		ND	
2-Butanone	~	~	0.12	100	NT		ND		NT		ND	
Acetone	~	~	0.05	100	NT		ND		NT		ND	
Benzene	0.06	0.06	0.06	2.9	NT		ND		NT		ND	
Carbon tetrachloride	~	~	0.76	1.4	NT		ND		NT		ND	
Chlorobenzene	~	~	1.1	100	NT		ND		NT		ND	
Chloroform	~	~	0.37	10	NT		ND		NT		ND	
cis-1,2-Dichloroethylene	~	~	0.25	59	NT		ND		NT		ND	
Ethyl Benzene	1	1	1	30	NT		ND		NT		ND	
Methyl tert-butyl ether (MTB	0.93	~	0.93	62	NT		ND		NT		ND	
Methylene chloride	~	~	0.05	51	NT		0.027		NT		0.014 JB	
Naphthalene	12	12	12	100	NT		ND		NT		ND	
n-Butylbenzene	12	12	12	100	NT		ND		NT		ND	
n-Propylbenzene	3.9	3.9	3.9	100	NT		ND		NT		ND	
o-Xylene	~	~	~	~	NT		ND		NT		ND	
p- & m- Xylenes	~	~	~	~	NT		ND		NT		ND	
sec-Butylbenzene	11	11	11	100	NT		ND		NT		ND	
tert-Butylbenzene	5.9	5.9	5.9	100	NT		ND		NT		ND	
Tetrachloroethylene	~	~	1.3	5.5	NT		ND		NT		ND	
Toluene	0.7	0.7	0.7	100	NT		ND		NT		ND	
trans-1,2-Dichloroethylene	~	~	0.19	100	NT		ND		NT		ND	
Trichloroethylene	~	~	0.47	10	NT		ND		NT		ND	
Vinyl Chloride	~	~	0.02	0.21	NT		ND		NT		ND	
Xylenes, Total	0.26	0.26	0.26	100	NT		ND		NT		ND	
Semi-Volatile Organic Compounds (SVOCs), NYSDEC Part 375 List												
Dilution Factor					2		2		2		2	
2-Methylphenol	~	~	0.33	100	ND		ND		ND		ND	
3- & 4-Methylphenols	~	~	0.33	34	ND		ND		ND		ND	
Acenaphthene	~	20	20	100	ND		ND		ND		ND	
Acenaphthylene	~	100	100	100	0.0793 J		ND		ND		ND	
Anthracene	~	100	100	100	0.09 J		ND		ND		0.101	
Benzo(a)anthracene	~	1	1	1	0.325		0.0787 J		0.102		0.257	
Benzo(a)pyrene	~	1	1	1	0.365		0.0795 J		0.104		0.259	
Benzo(b)fluoranthene	~	1	1	1	0.375		0.0718 J		0.0901 J		0.219	
Benzo(g,h,i)perylene	~	100	100	100	0.262		ND		0.067 J		0.178	
Benzo(k)fluoranthene	~	0.8	0.8	1	0.322		0.065 J		0.0662 J		0.203	
Chrysene	~	1	1	1	0.384		0.081 J		0.128 D		0.249	
Dibenzo(a,h)anthracene	~	0.33	0.33	0.33	0.0793 J		ND		ND		0.0454 J	
Dibenzofuran	~	~	7	14	ND		ND		ND		ND	
Fluoranthene	~	100	100	100	0.691		0.161		0.122		0.531	
Fluorene	~	30	30	100	ND		ND		ND		ND	
Hexachlorobenzene	~	~	0.33	0.33	ND		ND		ND		ND	
Indeno(1,2,3-cd)pyrene	~	0.5	0.5	0.5	0.301		0.0581 J		0.0638 J		0.196	
Naphthalene	12	12	12	100	ND		ND		ND		ND	
Pentachlorophenol	~	~	0.8	2.4	ND		ND		ND		ND	
Phenanthrene	~	100	100	100	0.323		0.107		0.0574 J		0.377	
Phenol	~	~	0.33	100	ND		ND		ND		ND	
Pyrene	~	100	100	100	0.582		0.137		0.12		0.501	

Table 1
Limited Phase II Environmental Site Assessment
MTA Property - Railroad Drive, City of Beacon, NY
Soil Laboratory Analytical Results Summary
LaBella Project No. 2222030

Sample ID (depth, ft. bgs)	ownfield Cleanup Program Part 375-6 Soil Cleanup Objectives				B-3 (1-2 ft)		B-3 (8-9 ft)		B-5 (1-2 ft)		B-5 (3-4 ft)	
Sampling Date/Time	CP/SCO Table 2- Gasoline	CP/SCO Table 3-Fuel Oil	Unrestricted Use	Residential Use	3/30/2022 13:00		3/30/2022 13:10		3/30/2022 14:15		3/30/2022 14:30	
Compound					Result	Q	Result	Q	Result	Q	Result	Q
Metals, RCRA												
Dilution Factor					1		1		1		1	
Arsenic	~	~	13	16	6.93		3.96		3.11		ND	
Barium	~	~	350	350	65.1		77.3		74.9		69.6	
Cadmium	~	~	2.5	2.5	ND		ND		ND		0.377	
Chromium	30	30	30	36	17.5		21.7		20.5		21.7	
Lead	~	~	63	400	51.9		65.4		21.8		79.4	
Mercury	~	~	0.18	0.81	0.131		0.56		0.0373		0.0804	
Selenium	~	~	3.9	36	ND		ND		ND		ND	
Silver	~	~	2	36	ND		ND		ND		ND	
Polychlorinated Biphenyls (PCB)												
Dilution Factor					1		1		1		1	
Aroclor 1016	~	~	~	~	ND		ND		ND		ND	
Aroclor 1221	~	~	~	~	ND		ND		ND		ND	
Aroclor 1232	~	~	~	~	ND		ND		ND		ND	
Aroclor 1242	~	~	~	~	ND		ND		ND		ND	
Aroclor 1248	~	~	~	~	ND		ND		ND		ND	
Aroclor 1254	~	~	~	~	ND		ND		ND		ND	
Aroclor 1260	~	~	~	~	ND		ND		ND		ND	
Total PCBs	~	~	0.1	1	ND		ND		ND		ND	
Total Solids												
% Solids	~	~	~	~	85.5		86.1		82.8		92.5	

NOTES:
Exceedances of NYSDEC Part 375-6 soil cleanup objectives (SCOs) are formatted consistent with the
All values displayed in milligrams per kilogram (mg/kg) or parts per million (ppm)
ND indicates analyte not detected at or above the MDL level indicated
NT indicates the analyte was not a target for this sample
(~) indicates that no regulatory limit has been established for this analyte
ft. bgs - feet below ground surface
VOCs analyzed by USEPA Method 8260
SVOCs analyzed by USEPA Method 8270
Metals analyzed by USEPA Method 6010/7471
PCBs analyzed by USEPA Method 8082
Q is the Qualifier Column with definitions as follows:
J indicates analyte detected at or above the MDL (method detection limit) but below the RL (Reporting Limit) - data is estimated
B indicates analyte found in the analysis batch blank
E indicates result is estimated and cannot be accurately reported due to levels encountered or interferences

Table 2					
Limited Phase II Environmental Site Assessment					
MTA Property - Railroad Drive, City of Beacon, NY					
Goundwater Laboratory Analytical Results Summary					
LaBella Project No. 2222030					
Sample ID	NYSDEC TOGS Standards and Guidance Values - GA	B-3		Trip Blank	
Sampling Date/Time		3/31/2022 8:00		3/31/2022 8:45	
Compound		Result	Q	Result	Q
Volatile Organic Compounds (VOCs), CP-51 Low level					
1,2,4-Trimethylbenzene	5	NT		ND	
1,3,5-Trimethylbenzene	5	NT		ND	
Benzene	1	NT		ND	
Ethyl Benzene	5	NT		ND	
Isopropylbenzene	5	NT		ND	
Methyl tert-butyl ether (MTBE)	10	NT		ND	
Naphthalene	10	NT		ND	
n-Butylbenzene	5	NT		ND	
n-Propylbenzene	5	NT		ND	
o-Xylene	5	NT		ND	
p- & m- Xylenes	5	NT		ND	
p-Isopropyltoluene	5	NT		ND	
sec-Butylbenzene	5	NT		ND	
tert-Butylbenzene	5	NT		ND	
Toluene	5	NT		ND	
Xylenes, Total	5	NT		ND	
Volatile Organic Compounds (VOCs), NYSDEC Part 375 List					
1,1,1-Trichloroethane	5	ND		NT	
1,1-Dichloroethane	5	ND		NT	
1,1-Dichloroethylene	5	ND		NT	
1,2,4-Trimethylbenzene	5	ND		NT	
1,2-Dichlorobenzene	3	ND		NT	
1,2-Dichloroethane	0.6	ND		NT	
1,3,5-Trimethylbenzene	5	ND		NT	
1,3-Dichlorobenzene	3	ND		NT	
1,4-Dichlorobenzene	3	ND		NT	
1,4-Dioxane	~	ND		NT	
2-Butanone	50	ND		NT	
Acetone	50	1.2	J	NT	
Benzene	1	ND		NT	
Carbon tetrachloride	5	ND		NT	
Chlorobenzene	5	ND		NT	
Chloroform	7	ND		NT	
cis-1,2-Dichloroethylene	5	ND		NT	
Ethyl Benzene	5	ND		NT	
Methyl tert-butyl ether (MTBE)	10	ND		NT	
Methylene chloride	5	ND		NT	
Naphthalene	10	ND		NT	
n-Butylbenzene	5	ND		NT	
n-Propylbenzene	5	ND		NT	
o-Xylene	5	ND		NT	
p- & m- Xylenes	~	ND		NT	
sec-Butylbenzene	5	ND		NT	
tert-Butylbenzene	5	ND		NT	
Tetrachloroethylene	5	ND		NT	
Toluene	5	0.39	J	NT	
trans-1,2-Dichloroethylene	5	ND		NT	
Trichloroethylene	5	ND		NT	
Vinyl Chloride	2	ND		NT	
Xylenes, Total	5	ND		NT	
Semi-Volatile Organic Compounds (SVOCs), NYSDEC Part 375 List					
2-Methylphenol	1	ND		NT	
3- & 4-Methylphenols	1	ND		NT	
Acenaphthene	20	ND		NT	
Acenaphthylene	~	0.716		NT	
Anthracene	50	0.305		NT	
Benzo(a)anthracene	0.002	0.105		NT	
Benzo(a)pyrene	0.002	0.105		NT	
Benzo(b)fluoranthene	0.002	0.137		NT	
Benzo(g,h,i)perylene	~	0.116		NT	
Benzo(k)fluoranthene	0.002	0.116		NT	
Chrysene	0.002	0.147		NT	
Dibenzo(a,h)anthracene	~	ND		NT	
Dibenzofuran	~	ND		NT	
Fluoranthene	50	0.253		NT	
Fluorene	50	ND		NT	
Hexachlorobenzene	0.04	ND		NT	
Indeno(1,2,3-cd)pyrene	0.002	0.0842		NT	
Naphthalene	10	0.116		NT	
Pentachlorophenol	1	ND		NT	
Phenanthrene	50	1.6		NT	
Phenol	1	ND		NT	
Pyrene	50	0.432		NT	

Table 2
Limited Phase II Environmental Site Assessment
MTA Property - Railroad Drive, City of Beacon, NY
Goundwater Laboratory Analytical Results Summary
LaBella Project No. 2222030

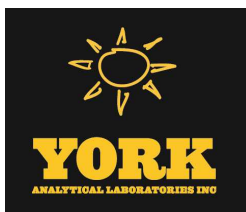
Sample ID	NYSDEC TOGS Standards and Guidance Values - GA	B-3		Trip Blank	
Sampling Date/Time		3/31/2022 8:00		3/31/2022 8:45	
Compound		Result	Q	Result	Q
Metals, RCRA Total					
Arsenic	25	1.17		NT	
Barium	1000	ND		NT	
Cadmium	5	ND		NT	
Chromium	50	2.13		NT	
Lead	25	ND		NT	
Mercury	0.7	0.2		NT	
Selenium	10	ND		NT	
Silver	50	ND		NT	
Metals, RCRA Dissolved					
Arsenic	25	1.37		NT	
Barium	1000	142		NT	
Cadmium	5	ND		NT	
Chromium	50	2.09	B	NT	
Lead	25	ND		NT	
Mercury	0.7	ND		NT	
Selenium	10	3.53		NT	
Silver	50	ND		NT	
Polychlorinated Biphenyls (PCB)					
Aroclor 1016	~	ND		NT	
Aroclor 1221	~	ND		NT	
Aroclor 1232	~	ND		NT	
Aroclor 1242	~	ND		NT	
Aroclor 1248	~	ND		NT	
Aroclor 1254	~	ND		NT	
Aroclor 1260	~	ND		NT	
Total PCBs	0.09	ND		NT	

NOTES:
Yellow highlight indicates that the compound was detected at a concentration above its respective 6 NYCRR Part 703 Groundwater Quality Standard or Technical and Operational Guidance Series (TOGS 1.1.1) Guidance Value
All values displayed in micrograms per liter (ug/L) or parts per billion (ppb)
ND - Indicates compound was not detected above the indicated laboratory method detection limit (MDL).
(-) Indicates the analyte was not a target for this sample
VOCs analyzed by USEPA Method 8260
SVOCs analyzed by USEPA Method 8270
Metals analyzed by USEPA Method 6010/7471
PCBs analyzed by USEPA Method 8082
Q is the Qualifier Column with definitions as follows:
J indicates analyte detected at or above the MDL (method detection limit) but below the RL (Reporting Limit),data is estima
B indicates analyte found in the analysis batch blank
E indicates result is estimated and cannot be accurately reported due to levels encountered or interferences



APPENDIX A

Laboratory Analytical Report



Technical Report

prepared for:

LaBella Associates (Poughkeepsie)

21 Fox Street

Poughkeepsie NY, 12601

Attention: Branson Fields

Report Date: 04/08/2022

Client Project ID: CZ42022 MTA Property-Beacon

York Project (SDG) No.: 22C1730

CT Cert. No. PH-0723

New Jersey Cert. No. CT005 and NY037



New York Cert. Nos. 10854 and 12058

PA Cert. No. 68-04440

120 RESEARCH DRIVE
www.YORKLAB.com

STRATFORD, CT 06615
(203) 325-1371



132-02 89th AVENUE
FAX (203) 357-0166

RICHMOND HILL, NY 11418
ClientServices@yorklab.com

Report Date: 04/08/2022
Client Project ID: CZ42022 MTA Property-Beacon
York Project (SDG) No.: 22C1730

LaBella Associates (Poughkeepsie)
21 Fox Street
Poughkeepsie NY, 12601
Attention: Branson Fields

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on March 31, 2022 and listed below. The project was identified as your project: **CZ42022 MTA Property-Beacon**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Sample and Analysis Qualifiers section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the Sample and Data Qualifiers Relating to This Work Order section of this report and case narrative if applicable.

The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

<u>York Sample ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Collected</u>	<u>Date Received</u>
22C1730-01	B-3 (1-2 ft)	Soil	03/30/2022	03/31/2022
22C1730-02	B-3 (8-9 ft)	Soil	03/30/2022	03/31/2022
22C1730-03	B-5 (1-2 ft)	Soil	03/30/2022	03/31/2022
22C1730-04	B-5 (3-4 ft)	Soil	03/30/2022	03/31/2022
22C1730-05	B3	Water	03/31/2022	03/31/2022
22C1730-06	Trip Blank	Water	03/31/2022	03/31/2022

General Notes for York Project (SDG) No.: 22C1730

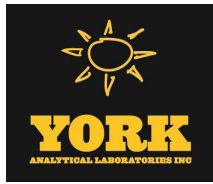
1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. York's liability for the above data is limited to the dollar value paid to York for the referenced project.
4. This report shall not be reproduced without the written approval of York Analytical Laboratories, Inc.
5. All analyses conducted met method or Laboratory SOP requirements. See the Sample and Data Qualifiers Section for further information.
6. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
7. This report reflects results that relate only to the samples submitted on the attached chain-of-custody form(s) received by York.
8. Analyses conducted at York Analytical Laboratories, Inc. Stratford, CT are indicated by NY Cert. No. 10854; those conducted at York Analytical Laboratories, Inc., Richmond Hill, NY are indicated by NY Cert. No. 12058.

Approved By: 

Date: 04/08/2022

Cassie L. Mosher
Laboratory Manager





Sample Information

Client Sample ID: B-3 (1-2 ft)

York Sample ID: 22C1730-01

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

22C1730

CZ42022 MTA Property-Beacon

Soil

March 30, 2022 1:00 pm

03/31/2022

Volatile Organics, CP-51 (formerly STARS) List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
95-63-6	1,2,4-Trimethylbenzene	ND		mg/kg dry	0.0029	0.0059	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 09:00	04/07/2022 17:56	FTR
108-67-8	1,3,5-Trimethylbenzene	ND		mg/kg dry	0.0029	0.0059	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 09:00	04/07/2022 17:56	FTR
71-43-2	Benzene	ND		mg/kg dry	0.0029	0.0059	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 09:00	04/07/2022 17:56	FTR
100-41-4	Ethyl Benzene	ND		mg/kg dry	0.0029	0.0059	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 09:00	04/07/2022 17:56	FTR
98-82-8	Isopropylbenzene	ND		mg/kg dry	0.0029	0.0059	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 09:00	04/07/2022 17:56	FTR
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		mg/kg dry	0.0029	0.0059	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 09:00	04/07/2022 17:56	FTR
91-20-3	Naphthalene	ND		mg/kg dry	0.0029	0.012	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 09:00	04/07/2022 17:56	FTR
104-51-8	n-Butylbenzene	ND		mg/kg dry	0.0029	0.0059	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 09:00	04/07/2022 17:56	FTR
103-65-1	n-Propylbenzene	ND		mg/kg dry	0.0029	0.0059	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 09:00	04/07/2022 17:56	FTR
95-47-6	o-Xylene	ND		mg/kg dry	0.0029	0.0059	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 09:00	04/07/2022 17:56	FTR
179601-23-1	p- & m- Xylenes	ND		mg/kg dry	0.0029	0.0059	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 09:00	04/07/2022 17:56	FTR
99-87-6	p-Isopropyltoluene	ND		mg/kg dry	0.0029	0.0059	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 09:00	04/07/2022 17:56	FTR
135-98-8	sec-Butylbenzene	ND		mg/kg dry	0.0029	0.0059	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 09:00	04/07/2022 17:56	FTR
98-06-6	tert-Butylbenzene	ND		mg/kg dry	0.0029	0.0059	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 09:00	04/07/2022 17:56	FTR
108-88-3	Toluene	ND		mg/kg dry	0.0029	0.0059	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 09:00	04/07/2022 17:56	FTR
1330-20-7	Xylenes, Total	ND		mg/kg dry	0.0029	0.0059	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP	04/07/2022 09:00	04/07/2022 17:56	FTR
Surrogate Recoveries		Result	Acceptance Range								
17060-07-0	Surrogate: SURR: 1,2-Dichloroethane-d4	98.7 %	77-125								
2037-26-5	Surrogate: SURR: Toluene-d8	96.5 %	85-120								
460-00-4	Surrogate: SURR: p-Bromofluorobenzene	91.6 %	76-130								

Semi-Volatiles, NYSDEC Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
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Sample Information

Client Sample ID: B-3 (1-2 ft)

York Sample ID: 22C1730-01

York Project (SDG) No.
22C1730

Client Project ID
CZ42022 MTA Property-Beacon

Matrix
Soil

Collection Date/Time
March 30, 2022 1:00 pm

Date Received
03/31/2022

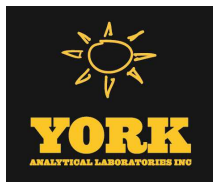
Semi-Volatiles, NYSDEC Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
95-48-7	2-Methylphenol	ND		ug/kg dry	47.8	95.4	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:21	KH
65794-96-9	3- & 4-Methylphenols	ND		ug/kg dry	47.8	95.4	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:21	KH
83-32-9	Acenaphthene	ND		ug/kg dry	47.8	95.4	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:21	KH
208-96-8	Acenaphthylene	79.3	J	ug/kg dry	47.8	95.4	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:21	KH
120-12-7	Anthracene	90.0	J	ug/kg dry	47.8	95.4	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:21	KH
56-55-3	Benzo(a)anthracene	325		ug/kg dry	47.8	95.4	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:21	KH
50-32-8	Benzo(a)pyrene	365		ug/kg dry	47.8	95.4	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:21	KH
205-99-2	Benzo(b)fluoranthene	375		ug/kg dry	47.8	95.4	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:21	KH
191-24-2	Benzo(g,h,i)perylene	262		ug/kg dry	47.8	95.4	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:21	KH
207-08-9	Benzo(k)fluoranthene	322		ug/kg dry	47.8	95.4	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:21	KH
218-01-9	Chrysene	384		ug/kg dry	47.8	95.4	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:21	KH
53-70-3	Dibenzo(a,h)anthracene	79.3	J	ug/kg dry	47.8	95.4	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:21	KH
132-64-9	Dibenzofuran	ND		ug/kg dry	47.8	95.4	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:21	KH
206-44-0	Fluoranthene	691		ug/kg dry	47.8	95.4	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:21	KH
86-73-7	Fluorene	ND		ug/kg dry	47.8	95.4	2	EPA 8270D Certifications: NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:21	KH
118-74-1	Hexachlorobenzene	ND		ug/kg dry	47.8	95.4	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:21	KH
193-39-5	Indeno(1,2,3-cd)pyrene	301		ug/kg dry	47.8	95.4	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:21	KH
91-20-3	Naphthalene	ND		ug/kg dry	47.8	95.4	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:21	KH
87-86-5	Pentachlorophenol	ND		ug/kg dry	47.8	95.4	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:21	KH
85-01-8	Phenanthrene	323		ug/kg dry	47.8	95.4	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:21	KH
108-95-2	Phenol	ND		ug/kg dry	47.8	95.4	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:21	KH
129-00-0	Pyrene	582		ug/kg dry	47.8	95.4	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:21	KH



Sample Information

Client Sample ID: B-3 (1-2 ft)

York Sample ID: 22C1730-01

York Project (SDG) No.

22C1730

Client Project ID

CZ42022 MTA Property-Beacon

Matrix

Soil

Collection Date/Time

March 30, 2022 1:00 pm

Date Received

03/31/2022

Semi-Volatiles, NYSDEC Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
Surrogate Recoveries		Result			Acceptance Range						
367-12-4	Surrogate: SURR: 2-Fluorophenol	55.1 %			20-108						
4165-62-2	Surrogate: SURR: Phenol-d5	57.2 %			23-114						
4165-60-0	Surrogate: SURR: Nitrobenzene-d5	59.1 %			22-108						
321-60-8	Surrogate: SURR: 2-Fluorobiphenyl	63.1 %			21-113						
118-79-6	Surrogate: SURR: 2,4,6-Tribromophenol	65.7 %			19-110						
1718-51-0	Surrogate: SURR: Terphenyl-d14	68.5 %			24-116						

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.		Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016		ND		mg/kg dry	0.0191	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 05:28	BJ
11104-28-2	Aroclor 1221		ND		mg/kg dry	0.0191	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 05:28	BJ
11141-16-5	Aroclor 1232		ND		mg/kg dry	0.0191	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 05:28	BJ
53469-21-9	Aroclor 1242		ND		mg/kg dry	0.0191	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 05:28	BJ
12672-29-6	Aroclor 1248		ND		mg/kg dry	0.0191	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 05:28	BJ
11097-69-1	Aroclor 1254		ND		mg/kg dry	0.0191	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 05:28	BJ
11096-82-5	Aroclor 1260		ND		mg/kg dry	0.0191	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 05:28	BJ
1336-36-3	* Total PCBs		ND		mg/kg dry	0.0191	1	EPA 8082A Certifications:	04/01/2022 07:32	04/02/2022 05:28	BJ
Surrogate Recoveries			Result	Acceptance Range							
877-09-8	Surrogate: Tetrachloro-m-xylene	59.5 %	30-140								
2051-24-3	Surrogate: Decachlorobiphenyl	58.5 %	30-140								

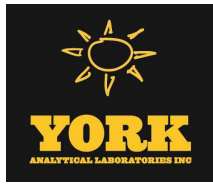
Metals, RCRA

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-38-2	Arsenic	6.93		mg/kg dry	1.76	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/31/2022 20:26	04/01/2022 17:18	KT
7440-39-3	Barium	65.1		mg/kg dry	2.93	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/31/2022 20:26	04/01/2022 17:18	KT
7440-43-9	Cadmium	ND		mg/kg dry	0.351	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/31/2022 20:26	04/01/2022 17:18	KT



Sample Information

Client Sample ID: B-3 (1-2 ft)

York Sample ID: 22C1730-01

York Project (SDG) No.

22C1730

Client Project ID

CZ42022 MTA Property-Beacon

Matrix

Soil

Collection Date/Time

March 30, 2022 1:00 pm

Date Received

03/31/2022

Metals, RCRA

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-47-3	Chromium	17.5		mg/kg dry	0.585	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/31/2022 20:26	04/01/2022 17:18	KT
7439-92-1	Lead	51.9		mg/kg dry	0.585	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/31/2022 20:26	04/01/2022 17:18	KT
7782-49-2	Selenium	ND		mg/kg dry	2.93	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/31/2022 20:26	04/01/2022 17:18	KT
7440-22-4	Silver	ND		mg/kg dry	0.585	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/31/2022 20:26	04/01/2022 17:18	KT

Mercury by 7473

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 7473 soil

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	0.131		mg/kg dry	0.0351	1	EPA 7473 Certifications: CTDOH,NJDEP,NELAC-NY10854,PADEP	04/06/2022 12:25	04/06/2022 16:31	ZZZ

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	85.5		%	0.100	1	SM 2540G Certifications: CTDOH	04/05/2022 15:30	04/06/2022 15:11	MEW

Sample Information

Client Sample ID: B-3 (8-9 ft)

York Sample ID: 22C1730-02

York Project (SDG) No.

22C1730

Client Project ID

CZ42022 MTA Property-Beacon

Matrix

Soil

Collection Date/Time

March 30, 2022 1:10 pm

Date Received

03/31/2022

Volatile Organics, NYSDEC Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
71-55-6	1,1,1-Trichloroethane	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 09:00	04/08/2022 12:46	FTR
75-34-3	1,1-Dichloroethane	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 09:00	04/08/2022 12:46	FTR
75-35-4	1,1-Dichloroethylene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 09:00	04/08/2022 12:46	FTR



Sample Information

Client Sample ID: B-3 (8-9 ft)

York Sample ID: 22C1730-02

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

22C1730

CZ42022 MTA Property-Beacon

Soil

March 30, 2022 1:10 pm

03/31/2022

Volatile Organics, NYSDEC Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
95-63-6	1,2,4-Trimethylbenzene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications:	04/08/2022 09:00 CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 12:46	FTR
95-50-1	1,2-Dichlorobenzene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications:	04/08/2022 09:00 CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 12:46	FTR
107-06-2	1,2-Dichloroethane	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications:	04/08/2022 09:00 CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 12:46	FTR
108-67-8	1,3,5-Trimethylbenzene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications:	04/08/2022 09:00 CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 12:46	FTR
541-73-1	1,3-Dichlorobenzene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications:	04/08/2022 09:00 CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 12:46	FTR
106-46-7	1,4-Dichlorobenzene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications:	04/08/2022 09:00 CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 12:46	FTR
123-91-1	1,4-Dioxane	ND		mg/kg dry	0.058	0.12	1	EPA 8260C Certifications:	04/08/2022 09:00 NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 12:46	FTR
78-93-3	2-Butanone	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications:	04/08/2022 09:00 CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 12:46	FTR
67-64-1	Acetone	ND		mg/kg dry	0.0058	0.012	1	EPA 8260C Certifications:	04/08/2022 09:00 CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 12:46	FTR
71-43-2	Benzene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications:	04/08/2022 09:00 CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 12:46	FTR
56-23-5	Carbon tetrachloride	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications:	04/08/2022 09:00 CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 12:46	FTR
108-90-7	Chlorobenzene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications:	04/08/2022 09:00 CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 12:46	FTR
67-66-3	Chloroform	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications:	04/08/2022 09:00 CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 12:46	FTR
156-59-2	cis-1,2-Dichloroethylene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications:	04/08/2022 09:00 CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 12:46	FTR
100-41-4	Ethyl Benzene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications:	04/08/2022 09:00 CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 12:46	FTR
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications:	04/08/2022 09:00 CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 12:46	FTR
75-09-2	Methylene chloride	0.027		mg/kg dry	0.0058	0.012	1	EPA 8260C Certifications:	04/08/2022 09:00 CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 12:46	FTR
91-20-3	Naphthalene	ND		mg/kg dry	0.0029	0.012	1	EPA 8260C Certifications:	04/08/2022 09:00 NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 12:46	FTR
104-51-8	n-Butylbenzene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications:	04/08/2022 09:00 CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 12:46	FTR
103-65-1	n-Propylbenzene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications:	04/08/2022 09:00 CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 12:46	FTR
95-47-6	o-Xylene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications:	04/08/2022 09:00 CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 12:46	FTR
179601-23-1	p- & m- Xylenes	ND		mg/kg dry	0.0058	0.012	1	EPA 8260C Certifications:	04/08/2022 09:00 CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 12:46	FTR
135-98-8	sec-Butylbenzene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications:	04/08/2022 09:00 CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 12:46	FTR



Sample Information

Client Sample ID: B-3 (8-9 ft)

York Sample ID: 22C1730-02

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

22C1730

CZ42022 MTA Property-Beacon

Soil

March 30, 2022 1:10 pm

03/31/2022

Volatile Organics, NYSDEC Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
98-06-6	tert-Butylbenzene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 09:00	04/08/2022 12:46	FTR
127-18-4	Tetrachloroethylene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 09:00	04/08/2022 12:46	FTR
108-88-3	Toluene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 09:00	04/08/2022 12:46	FTR
156-60-5	trans-1,2-Dichloroethylene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 09:00	04/08/2022 12:46	FTR
79-01-6	Trichloroethylene	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 09:00	04/08/2022 12:46	FTR
75-01-4	Vinyl Chloride	ND		mg/kg dry	0.0029	0.0058	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/08/2022 09:00	04/08/2022 12:46	FTR
1330-20-7	Xylenes, Total	ND		mg/kg dry	0.0087	0.017	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP	04/08/2022 09:00	04/08/2022 12:46	FTR
Surrogate Recoveries		Result		Acceptance Range							
17060-07-0	Surrogate: SURR: 1,2-Dichloroethane-d4	110 %		77-125							
2037-26-5	Surrogate: SURR: Toluene-d8	104 %		85-120							
460-00-4	Surrogate: SURR: p-Bromofluorobenzene	96.2 %		76-130							

Semi-Volatiles, NYSDEC Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
95-48-7	2-Methylphenol	ND		ug/kg dry	47.9	95.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:51	KH
65794-96-9	3- & 4-Methylphenols	ND		ug/kg dry	47.9	95.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:51	KH
83-32-9	Acenaphthene	ND		ug/kg dry	47.9	95.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:51	KH
208-96-8	Acenaphthylene	ND		ug/kg dry	47.9	95.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:51	KH
120-12-7	Anthracene	ND		ug/kg dry	47.9	95.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:51	KH
56-55-3	Benzo(a)anthracene	78.7	J	ug/kg dry	47.9	95.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:51	KH
50-32-8	Benzo(a)pyrene	79.5	J	ug/kg dry	47.9	95.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:51	KH
205-99-2	Benzo(b)fluoranthene	71.8	J	ug/kg dry	47.9	95.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:51	KH
191-24-2	Benzo(g,h,i)perylene	ND		ug/kg dry	47.9	95.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:51	KH
207-08-9	Benzo(k)fluoranthene	65.0	J	ug/kg dry	47.9	95.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:51	KH



Sample Information

Client Sample ID: B-3 (8-9 ft)

York Sample ID: 22C1730-02

York Project (SDG) No.
22C1730

Client Project ID
CZ42022 MTA Property-Beacon

Matrix
Soil

Collection Date/Time
March 30, 2022 1:10 pm

Date Received
03/31/2022

Semi-Volatiles, NYSDEC Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
218-01-9	Chrysene	81.0	J	ug/kg dry	47.9	95.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:51	KH
53-70-3	Dibenzo(a,h)anthracene	ND		ug/kg dry	47.9	95.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:51	KH
132-64-9	Dibenzofuran	ND		ug/kg dry	47.9	95.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:51	KH
206-44-0	Fluoranthene	161		ug/kg dry	47.9	95.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:51	KH
86-73-7	Fluorene	ND		ug/kg dry	47.9	95.6	2	EPA 8270D Certifications: NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:51	KH
118-74-1	Hexachlorobenzene	ND		ug/kg dry	47.9	95.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:51	KH
193-39-5	Indeno(1,2,3-cd)pyrene	58.1	J	ug/kg dry	47.9	95.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:51	KH
91-20-3	Naphthalene	ND		ug/kg dry	47.9	95.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:51	KH
87-86-5	Pentachlorophenol	ND		ug/kg dry	47.9	95.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:51	KH
85-01-8	Phenanthrene	107		ug/kg dry	47.9	95.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:51	KH
108-95-2	Phenol	ND		ug/kg dry	47.9	95.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:51	KH
129-00-0	Pyrene	137		ug/kg dry	47.9	95.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 11:51	KH
Surrogate Recoveries		Result	Acceptance Range								
367-12-4	Surrogate: SURR: 2-Fluorophenol	69.1 %	20-108								
4165-62-2	Surrogate: SURR: Phenol-d5	68.0 %	23-114								
4165-60-0	Surrogate: SURR: Nitrobenzene-d5	73.5 %	22-108								
321-60-8	Surrogate: SURR: 2-Fluorobiphenyl	72.6 %	21-113								
118-79-6	Surrogate: SURR: 2,4,6-Tribromophenol	70.8 %	19-110								
1718-51-0	Surrogate: SURR: Terphenyl-d14	73.6 %	24-116								

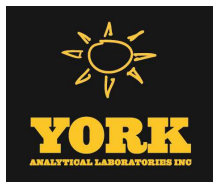
Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND		mg/kg dry	0.0193	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 05:42	BJ
11104-28-2	Aroclor 1221	ND		mg/kg dry	0.0193	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 05:42	BJ
11141-16-5	Aroclor 1232	ND		mg/kg dry	0.0193	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 05:42	BJ



Sample Information

Client Sample ID: B-3 (8-9 ft)

York Sample ID: 22C1730-02

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

22C1730

CZ42022 MTA Property-Beacon

Soil

March 30, 2022 1:10 pm

03/31/2022

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
53469-21-9	Aroclor 1242	ND		mg/kg dry	0.0193	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 05:42	BJ
12672-29-6	Aroclor 1248	ND		mg/kg dry	0.0193	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 05:42	BJ
11097-69-1	Aroclor 1254	ND		mg/kg dry	0.0193	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 05:42	BJ
11096-82-5	Aroclor 1260	ND		mg/kg dry	0.0193	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 05:42	BJ
1336-36-3	* Total PCBs	ND		mg/kg dry	0.0193	1	EPA 8082A Certifications:	04/01/2022 07:32	04/02/2022 05:42	BJ
Surrogate Recoveries		Result		Acceptance Range						
877-09-8	Surrogate: Tetrachloro-m-xylene	68.5 %		30-140						
2051-24-3	Surrogate: Decachlorobiphenyl	76.5 %		30-140						

Metals, RCRA

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-38-2	Arsenic	3.96		mg/kg dry	1.74	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/31/2022 20:26	04/01/2022 17:27	KT
7440-39-3	Barium	77.3		mg/kg dry	2.90	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/31/2022 20:26	04/01/2022 17:27	KT
7440-43-9	Cadmium	ND		mg/kg dry	0.349	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/31/2022 20:26	04/01/2022 17:27	KT
7440-47-3	Chromium	21.7		mg/kg dry	0.581	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/31/2022 20:26	04/01/2022 17:27	KT
7439-92-1	Lead	65.4		mg/kg dry	0.581	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/31/2022 20:26	04/01/2022 17:27	KT
7782-49-2	Selenium	ND		mg/kg dry	2.90	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/31/2022 20:26	04/01/2022 17:27	KT
7440-22-4	Silver	ND		mg/kg dry	0.581	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/31/2022 20:26	04/01/2022 17:27	KT

Mercury by 7473

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 7473 soil

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	0.560		mg/kg dry	0.0349	1	EPA 7473 Certifications: CTDOH,NJDEP,NELAC-NY10854,PADEP	04/06/2022 12:25	04/06/2022 16:41	ZZZ

Total Solids

Log-in Notes:

Sample Notes:



Sample Information

Client Sample ID: B-3 (8-9 ft)

York Sample ID: 22C1730-02

York Project (SDG) No.
22C1730

Client Project ID
CZ42022 MTA Property-Beacon

Matrix
Soil

Collection Date/Time
March 30, 2022 1:10 pm

Date Received
03/31/2022

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	86.1		%	0.100	1	SM 2540G Certifications: CTDOH	04/05/2022 15:30	04/06/2022 15:11	MEW

Sample Information

Client Sample ID: B-5 (1-2 ft)

York Sample ID: 22C1730-03

York Project (SDG) No.
22C1730

Client Project ID
CZ42022 MTA Property-Beacon

Matrix
Soil

Collection Date/Time
March 30, 2022 2:15 pm

Date Received
03/31/2022

Volatile Organics, CP-51 (formerly STARS) List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
95-63-6	1,2,4-Trimethylbenzene	ND		mg/kg dry	0.0030	0.0060	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:27	FTR
108-67-8	1,3,5-Trimethylbenzene	ND		mg/kg dry	0.0030	0.0060	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:27	FTR
71-43-2	Benzene	ND		mg/kg dry	0.0030	0.0060	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:27	FTR
100-41-4	Ethyl Benzene	ND		mg/kg dry	0.0030	0.0060	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:27	FTR
98-82-8	Isopropylbenzene	ND		mg/kg dry	0.0030	0.0060	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:27	FTR
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		mg/kg dry	0.0030	0.0060	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:27	FTR
91-20-3	Naphthalene	ND		mg/kg dry	0.0030	0.012	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:27	FTR
104-51-8	n-Butylbenzene	ND		mg/kg dry	0.0030	0.0060	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:27	FTR
103-65-1	n-Propylbenzene	ND		mg/kg dry	0.0030	0.0060	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:27	FTR
95-47-6	o-Xylene	ND		mg/kg dry	0.0030	0.0060	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:27	FTR
179601-23-1	p- & m- Xylenes	ND		mg/kg dry	0.0030	0.0060	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:27	FTR
99-87-6	p-Isopropyltoluene	ND		mg/kg dry	0.0030	0.0060	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:27	FTR
135-98-8	sec-Butylbenzene	ND		mg/kg dry	0.0030	0.0060	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:27	FTR
98-06-6	tert-Butylbenzene	ND		mg/kg dry	0.0030	0.0060	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:27	FTR
108-88-3	Toluene	ND		mg/kg dry	0.0030	0.0060	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:27	FTR



Sample Information

Client Sample ID: B-5 (1-2 ft)

York Sample ID: 22C1730-03

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

22C1730

CZ42022 MTA Property-Beacon

Soil

March 30, 2022 2:15 pm

03/31/2022

Volatile Organics, CP-51 (formerly STARS) List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
1330-20-7	Xylenes, Total	ND		mg/kg dry	0.0030	0.0060	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:27	FTR
Surrogate Recoveries		Result		Acceptance Range							
17060-07-0	Surrogate: SURRE: 1,2-Dichloroethane-d4	97.2 %		77-125							
2037-26-5	Surrogate: SURRE: Toluene-d8	97.7 %		85-120							
460-00-4	Surrogate: SURRE: p-Bromofluorobenzene	97.7 %		76-130							

Semi-Volatiles, NYSDEC Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
95-48-7	2-Methylphenol	ND		ug/kg dry	50.0	99.8	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:22	KH
65794-96-9	3- & 4-Methylphenols	ND		ug/kg dry	50.0	99.8	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:22	KH
83-32-9	Acenaphthene	ND		ug/kg dry	50.0	99.8	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:22	KH
208-96-8	Acenaphthylene	ND		ug/kg dry	50.0	99.8	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:22	KH
120-12-7	Anthracene	ND		ug/kg dry	50.0	99.8	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:22	KH
56-55-3	Benzo(a)anthracene	102		ug/kg dry	50.0	99.8	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:22	KH
50-32-8	Benzo(a)pyrene	104		ug/kg dry	50.0	99.8	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:22	KH
205-99-2	Benzo(b)fluoranthene	90.1	J	ug/kg dry	50.0	99.8	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:22	KH
191-24-2	Benzo(g,h,i)perylene	67.0	J	ug/kg dry	50.0	99.8	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:22	KH
207-08-9	Benzo(k)fluoranthene	66.2	J	ug/kg dry	50.0	99.8	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:22	KH
218-01-9	Chrysene	128		ug/kg dry	50.0	99.8	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:22	KH
53-70-3	Dibenzo(a,h)anthracene	ND		ug/kg dry	50.0	99.8	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:22	KH
132-64-9	Dibenzofuran	ND		ug/kg dry	50.0	99.8	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:22	KH
206-44-0	Fluoranthene	122		ug/kg dry	50.0	99.8	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:22	KH
86-73-7	Fluorene	ND		ug/kg dry	50.0	99.8	2	EPA 8270D Certifications: NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:22	KH
118-74-1	Hexachlorobenzene	ND		ug/kg dry	50.0	99.8	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:22	KH



Sample Information

Client Sample ID: B-5 (1-2 ft)

York Sample ID: 22C1730-03

York Project (SDG) No.

22C1730

Client Project ID

CZ42022 MTA Property-Beacon

Matrix

Soil

Collection Date/Time

March 30, 2022 2:15 pm

Date Received

03/31/2022

Semi-Volatiles, NYSDEC Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
193-39-5	Indeno(1,2,3-cd)pyrene	63.8	J	ug/kg dry	50.0	99.8	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:22	KH
91-20-3	Naphthalene	ND		ug/kg dry	50.0	99.8	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:22	KH
87-86-5	Pentachlorophenol	ND		ug/kg dry	50.0	99.8	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:22	KH
85-01-8	Phenanthrene	57.4	J	ug/kg dry	50.0	99.8	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:22	KH
108-95-2	Phenol	ND		ug/kg dry	50.0	99.8	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:22	KH
129-00-0	Pyrene	120		ug/kg dry	50.0	99.8	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:22	KH
Surrogate Recoveries		Result	Acceptance Range								
367-12-4	Surrogate: SURR: 2-Fluorophenol	55.3 %	20-108								
4165-62-2	Surrogate: SURR: Phenol-d5	55.0 %	23-114								
4165-60-0	Surrogate: SURR: Nitrobenzene-d5	59.1 %	22-108								
321-60-8	Surrogate: SURR: 2-Fluorobiphenyl	59.4 %	21-113								
118-79-6	Surrogate: SURR: 2,4,6-Tribromophenol	57.7 %	19-110								
1718-51-0	Surrogate: SURR: Terphenyl-d14	59.1 %	24-116								

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.		Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016		ND		mg/kg dry	0.0199	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 05:55	BJ
11104-28-2	Aroclor 1221		ND		mg/kg dry	0.0199	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 05:55	BJ
11141-16-5	Aroclor 1232		ND		mg/kg dry	0.0199	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 05:55	BJ
53469-21-9	Aroclor 1242		ND		mg/kg dry	0.0199	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 05:55	BJ
12672-29-6	Aroclor 1248		ND		mg/kg dry	0.0199	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 05:55	BJ
11097-69-1	Aroclor 1254		ND		mg/kg dry	0.0199	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 05:55	BJ
11096-82-5	Aroclor 1260		ND		mg/kg dry	0.0199	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 05:55	BJ
1336-36-3	* Total PCBs		ND		mg/kg dry	0.0199	1	EPA 8082A Certifications:	04/01/2022 07:32	04/02/2022 05:55	BJ
Surrogate Recoveries			Result	Acceptance Range							
877-09-8	Surrogate: Tetrachloro-m-xylene		74.0 %	30-140							
2051-24-3	Surrogate: Decachlorobiphenyl		79.0 %	30-140							



Sample Information

Client Sample ID: B-5 (1-2 ft)

York Sample ID: 22C1730-03

York Project (SDG) No.
22C1730

Client Project ID
CZ42022 MTA Property-Beacon

Matrix
Soil

Collection Date/Time
March 30, 2022 2:15 pm

Date Received
03/31/2022

Metals, RCRA

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-38-2	Arsenic	3.11		mg/kg dry	1.81	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 17:09	04/05/2022 21:31	KT
7440-39-3	Barium	74.9		mg/kg dry	3.02	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 17:09	04/05/2022 21:31	KT
7440-43-9	Cadmium	ND		mg/kg dry	0.362	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 17:09	04/05/2022 21:31	KT
7440-47-3	Chromium	20.5		mg/kg dry	0.604	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 17:09	04/05/2022 21:31	KT
7439-92-1	Lead	21.8		mg/kg dry	0.604	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 17:09	04/05/2022 21:31	KT
7782-49-2	Selenium	ND		mg/kg dry	3.02	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 17:09	04/05/2022 21:31	KT
7440-22-4	Silver	ND		mg/kg dry	0.604	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 17:09	04/05/2022 21:31	KT

Mercury by 7473

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 7473 soil

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	0.0373		mg/kg dry	0.0362	1	EPA 7473 Certifications: CTDOH,NJDEP,NELAC-NY10854,PADEP	04/06/2022 12:25	04/06/2022 16:50	ZZZ

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	82.8		%	0.100	1	SM 2540G Certifications: CTDOH	04/05/2022 15:30	04/06/2022 15:11	MEW

Sample Information

Client Sample ID: B-5 (3-4 ft)

York Sample ID: 22C1730-04

York Project (SDG) No.
22C1730

Client Project ID
CZ42022 MTA Property-Beacon

Matrix
Soil

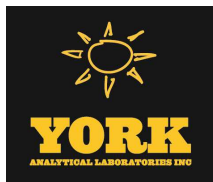
Collection Date/Time
March 30, 2022 2:30 pm

Date Received
03/31/2022

Volatile Organics, NYSDEC Part 375 List

Log-in Notes:

Sample Notes:



Sample Information

Client Sample ID: B-5 (3-4 ft)

York Sample ID: 22C1730-04

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

22C1730

CZ42022 MTA Property-Beacon

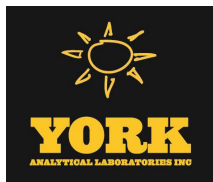
Soil

March 30, 2022 2:30 pm

03/31/2022

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
71-55-6	1,1,1-Trichloroethane	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
75-34-3	1,1-Dichloroethane	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
75-35-4	1,1-Dichloroethylene	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
95-63-6	1,2,4-Trimethylbenzene	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
95-50-1	1,2-Dichlorobenzene	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
107-06-2	1,2-Dichloroethane	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
108-67-8	1,3,5-Trimethylbenzene	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
541-73-1	1,3-Dichlorobenzene	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
106-46-7	1,4-Dichlorobenzene	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
123-91-1	1,4-Dioxane	ND		mg/kg dry	0.11	0.22	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
78-93-3	2-Butanone	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
67-64-1	Acetone	ND		mg/kg dry	0.011	0.022	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
71-43-2	Benzene	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
56-23-5	Carbon tetrachloride	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
108-90-7	Chlorobenzene	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
67-66-3	Chloroform	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
156-59-2	cis-1,2-Dichloroethylene	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
100-41-4	Ethyl Benzene	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
75-09-2	Methylene chloride	0.014	J, B	mg/kg dry	0.011	0.022	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
91-20-3	Naphthalene	ND		mg/kg dry	0.0054	0.022	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
104-51-8	n-Butylbenzene	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
103-65-1	n-Propylbenzene	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
95-47-6	o-Xylene	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR



Sample Information

Client Sample ID: B-5 (3-4 ft)

York Sample ID: 22C1730-04

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

22C1730

CZ42022 MTA Property-Beacon

Soil

March 30, 2022 2:30 pm

03/31/2022

Volatile Organics, NYSDEC Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
179601-23-1	p- & m- Xylenes	ND		mg/kg dry	0.011	0.022	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
135-98-8	sec-Butylbenzene	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
98-06-6	tert-Butylbenzene	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
127-18-4	Tetrachloroethylene	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
108-88-3	Toluene	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
156-60-5	trans-1,2-Dichloroethylene	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
79-01-6	Trichloroethylene	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
75-01-4	Vinyl Chloride	ND		mg/kg dry	0.0054	0.011	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/07/2022 12:30	04/07/2022 23:55	FTR
1330-20-7	Xylenes, Total	ND		mg/kg dry	0.016	0.032	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP	04/07/2022 12:30	04/07/2022 23:55	FTR
Surrogate Recoveries		Result		Acceptance Range							
17060-07-0	Surrogate: SURR: 1,2-Dichloroethane-d4	123 %				77-125					
2037-26-5	Surrogate: SURR: Toluene-d8	92.6 %				85-120					
460-00-4	Surrogate: SURR: p-Bromofluorobenzene	97.9 %				76-130					

Semi-Volatiles, NYSDEC Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
95-48-7	2-Methylphenol	ND		ug/kg dry	44.4	88.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:52	KH
65794-96-9	3- & 4-Methylphenols	ND		ug/kg dry	44.4	88.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:52	KH
83-32-9	Acenaphthene	ND		ug/kg dry	44.4	88.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:52	KH
208-96-8	Acenaphthylene	ND		ug/kg dry	44.4	88.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:52	KH
120-12-7	Anthracene	101		ug/kg dry	44.4	88.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:52	KH
56-55-3	Benzo(a)anthracene	257		ug/kg dry	44.4	88.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:52	KH
50-32-8	Benzo(a)pyrene	259		ug/kg dry	44.4	88.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:52	KH
205-99-2	Benzo(b)fluoranthene	219		ug/kg dry	44.4	88.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:52	KH



Sample Information

Client Sample ID: B-5 (3-4 ft)

York Sample ID: 22C1730-04

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

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22C1730

CZ42022 MTA Property-Beacon

Soil

March 30, 2022 2:30 pm

03/31/2022

Semi-Volatiles, NYSDEC Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
191-24-2	Benzo(g,h,i)perylene	178		ug/kg dry	44.4	88.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:52	KH
207-08-9	Benzo(k)fluoranthene	203		ug/kg dry	44.4	88.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:52	KH
218-01-9	Chrysene	249		ug/kg dry	44.4	88.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:52	KH
53-70-3	Dibenzo(a,h)anthracene	45.4	J	ug/kg dry	44.4	88.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:52	KH
132-64-9	Dibenzofuran	ND		ug/kg dry	44.4	88.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:52	KH
206-44-0	Fluoranthene	531		ug/kg dry	44.4	88.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:52	KH
86-73-7	Fluorene	ND		ug/kg dry	44.4	88.6	2	EPA 8270D Certifications: NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:52	KH
118-74-1	Hexachlorobenzene	ND		ug/kg dry	44.4	88.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:52	KH
193-39-5	Indeno(1,2,3-cd)pyrene	196		ug/kg dry	44.4	88.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:52	KH
91-20-3	Naphthalene	ND		ug/kg dry	44.4	88.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:52	KH
87-86-5	Pentachlorophenol	ND		ug/kg dry	44.4	88.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:52	KH
85-01-8	Phenanthrene	377		ug/kg dry	44.4	88.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:52	KH
108-95-2	Phenol	ND		ug/kg dry	44.4	88.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:52	KH
129-00-0	Pyrene	501		ug/kg dry	44.4	88.6	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/02/2022 06:43	04/05/2022 12:52	KH
Surrogate Recoveries		Result	Acceptance Range								
367-12-4	Surrogate: SURR: 2-Fluorophenol	66.4 %	20-108								
4165-62-2	Surrogate: SURR: Phenol-d5	65.6 %	23-114								
4165-60-0	Surrogate: SURR: Nitrobenzene-d5	71.4 %	22-108								
321-60-8	Surrogate: SURR: 2-Fluorobiphenyl	72.9 %	21-113								
118-79-6	Surrogate: SURR: 2,4,6-Tribromophenol	71.4 %	19-110								
1718-51-0	Surrogate: SURR: Terphenyl-d14	74.0 %	24-116								

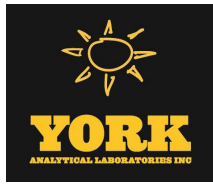
Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND		mg/kg dry	0.0179	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 06:09	BJ



Sample Information

Client Sample ID: B-5 (3-4 ft)

York Sample ID: 22C1730-04

York Project (SDG) No.

22C1730

Client Project ID

CZ42022 MTA Property-Beacon

Matrix

Soil

Collection Date/Time

March 30, 2022 2:30 pm

Date Received

03/31/2022

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
11104-28-2	Aroclor 1221	ND		mg/kg dry	0.0179	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 06:09	BJ
11141-16-5	Aroclor 1232	ND		mg/kg dry	0.0179	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 06:09	BJ
53469-21-9	Aroclor 1242	ND		mg/kg dry	0.0179	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 06:09	BJ
12672-29-6	Aroclor 1248	ND		mg/kg dry	0.0179	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 06:09	BJ
11097-69-1	Aroclor 1254	ND		mg/kg dry	0.0179	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 06:09	BJ
11096-82-5	Aroclor 1260	ND		mg/kg dry	0.0179	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/01/2022 07:32	04/02/2022 06:09	BJ
1336-36-3	* Total PCBs	ND		mg/kg dry	0.0179	1	EPA 8082A Certifications:	04/01/2022 07:32	04/02/2022 06:09	BJ
Surrogate Recoveries		Result		Acceptance Range						
877-09-8	Surrogate: Tetrachloro-m-xylene	85.5 %		30-140						
2051-24-3	Surrogate: Decachlorobiphenyl	76.0 %		30-140						

Metals, RCRA

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-38-2	Arsenic	ND		mg/kg dry	1.62	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 17:09	04/05/2022 21:40	KT
7440-39-3	Barium	69.6		mg/kg dry	2.70	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 17:09	04/05/2022 21:40	KT
7440-43-9	Cadmium	0.377		mg/kg dry	0.324	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 17:09	04/05/2022 21:40	KT
7440-47-3	Chromium	21.7		mg/kg dry	0.540	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 17:09	04/05/2022 21:40	KT
7439-92-1	Lead	79.4		mg/kg dry	0.540	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 17:09	04/05/2022 21:40	KT
7782-49-2	Selenium	ND		mg/kg dry	2.70	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 17:09	04/05/2022 21:40	KT
7440-22-4	Silver	ND		mg/kg dry	0.540	1	EPA 6010D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 17:09	04/05/2022 21:40	KT

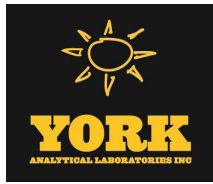
Mercury by 7473

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 7473 soil

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	0.0804		mg/kg dry	0.0324	1	EPA 7473 Certifications: CTDOH,NJDEP,NELAC-NY10854,PADEP	04/06/2022 12:25	04/06/2022 16:58	ZZZ



Sample Information

Client Sample ID: B-5 (3-4 ft)

York Sample ID: 22C1730-04

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

22C1730

CZ42022 MTA Property-Beacon

Soil

March 30, 2022 2:30 pm

03/31/2022

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	92.5		%	0.100	1	SM 2540G Certifications: CTDOH	04/05/2022 15:30	04/06/2022 15:11	MEW

Sample Information

Client Sample ID: B3

York Sample ID: 22C1730-05

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

22C1730

CZ42022 MTA Property-Beacon

Water

March 31, 2022 8:00 am

03/31/2022

Volatile Organics, NYSDEC Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
71-55-6	1,1,1-Trichloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
75-34-3	1,1-Dichloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
75-35-4	1,1-Dichloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
95-63-6	1,2,4-Trimethylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
95-50-1	1,2-Dichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
107-06-2	1,2-Dichloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
108-67-8	1,3,5-Trimethylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
541-73-1	1,3-Dichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
106-46-7	1,4-Dichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
123-91-1	1,4-Dioxane	ND		ug/L	40	80	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
78-93-3	2-Butanone	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
67-64-1	Acetone	1.2	J	ug/L	1.0	2.0	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
71-43-2	Benzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
56-23-5	Carbon tetrachloride	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD



Sample Information

Client Sample ID: B3

York Sample ID: 22C1730-05

York Project (SDG) No.
22C1730

Client Project ID
CZ42022 MTA Property-Beacon

Matrix
Water

Collection Date/Time
March 31, 2022 8:00 am

Date Received
03/31/2022

Volatile Organics, NYSDEC Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-90-7	Chlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
67-66-3	Chloroform	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
156-59-2	cis-1,2-Dichloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
100-41-4	Ethyl Benzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
75-09-2	Methylene chloride	ND		ug/L	1.0	2.0	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
91-20-3	Naphthalene	ND		ug/L	1.0	2.0	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
104-51-8	n-Butylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
103-65-1	n-Propylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
95-47-6	o-Xylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
179601-23-1	p- & m- Xylenes	ND		ug/L	0.50	1.0	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
135-98-8	sec-Butylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
98-06-6	tert-Butylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
127-18-4	Tetrachloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
108-88-3	Toluene	0.39	J	ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
156-60-5	trans-1,2-Dichloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
79-01-6	Trichloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
75-01-4	Vinyl Chloride	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058,PADEP	04/05/2022 09:00	04/05/2022 14:37	PD
1330-20-7	Xylenes, Total	ND		ug/L	0.60	1.5	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,NELAC-NY12058	04/05/2022 09:00	04/05/2022 14:37	PD
Surrogate Recoveries		Result	Acceptance Range								
17060-07-0	Surrogate: SURRE: 1,2-Dichloroethane-d4	106 %	69-130								
2037-26-5	Surrogate: SURRE: Toluene-d8	99.6 %	81-117								
460-00-4	Surrogate: SURRE: p-Bromofluorobenzene	102 %	79-122								

Semi-Volatiles, NYSDEC Part 375 List

Log-in Notes:

Sample Notes:

120 RESEARCH DRIVE
www.YORKLAB.com

STRATFORD, CT 06615
(203) 325-1371

132-02 89th AVENUE
FAX (203) 357-0166

RICHMOND HILL, NY 11418
ClientServices@



Sample Information

Client Sample ID: B3

York Sample ID: 22C1730-05

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

22C1730

CZ42022 MTA Property-Beacon

Water

March 31, 2022 8:00 am

03/31/2022

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
95-48-7	2-Methylphenol	ND		ug/L	2.63	5.26	1	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 13:32	04/05/2022 22:14	KH
65794-96-9	3- & 4-Methylphenols	ND		ug/L	2.63	5.26	1	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 13:32	04/05/2022 22:14	KH
83-32-9	Acenaphthene	ND		ug/L	0.0526	0.0526	1	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 13:32	04/07/2022 18:57	KH
208-96-8	Acenaphthylene	0.716		ug/L	0.0526	0.0526	1	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 13:32	04/07/2022 18:57	KH
120-12-7	Anthracene	0.305		ug/L	0.0526	0.0526	1	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 13:32	04/07/2022 18:57	KH
56-55-3	Benzo(a)anthracene	0.105		ug/L	0.0526	0.0526	1	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 13:32	04/07/2022 18:57	KH
50-32-8	Benzo(a)pyrene	0.105		ug/L	0.0526	0.0526	1	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 13:32	04/07/2022 18:57	KH
205-99-2	Benzo(b)fluoranthene	0.137		ug/L	0.0526	0.0526	1	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 13:32	04/07/2022 18:57	KH
191-24-2	Benzo(g,h,i)perylene	0.116		ug/L	0.0526	0.0526	1	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 13:32	04/07/2022 18:57	KH
207-08-9	Benzo(k)fluoranthene	0.116		ug/L	0.0526	0.0526	1	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 13:32	04/07/2022 18:57	KH
218-01-9	Chrysene	0.147		ug/L	0.0526	0.0526	1	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 13:32	04/07/2022 18:57	KH
53-70-3	Dibenzo(a,h)anthracene	ND		ug/L	0.0526	0.0526	1	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 13:32	04/07/2022 18:57	KH
132-64-9	Dibenzofuran	ND		ug/L	2.63	5.26	1	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 13:32	04/05/2022 22:14	KH
206-44-0	Fluoranthene	0.253		ug/L	0.0526	0.0526	1	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 13:32	04/07/2022 18:57	KH
86-73-7	Fluorene	ND		ug/L	0.0526	0.0526	1	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 13:32	04/07/2022 18:57	KH
118-74-1	Hexachlorobenzene	ND		ug/L	0.0211	0.0211	1	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 13:32	04/07/2022 18:57	KH
193-39-5	Indeno(1,2,3-cd)pyrene	0.0842		ug/L	0.0526	0.0526	1	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 13:32	04/07/2022 18:57	KH
91-20-3	Naphthalene	0.116		ug/L	0.0526	0.0526	1	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 13:32	04/07/2022 18:57	KH
87-86-5	Pentachlorophenol	ND		ug/L	0.263	0.263	1	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 13:32	04/07/2022 18:57	KH
85-01-8	Phenanthrene	1.60		ug/L	0.0526	0.0526	1	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 13:32	04/07/2022 18:57	KH
108-95-2	Phenol	ND		ug/L	2.63	5.26	1	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 13:32	04/05/2022 22:14	KH
129-00-0	Pyrene	0.432		ug/L	0.0526	0.0526	1	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/04/2022 13:32	04/07/2022 18:57	KH
Surrogate Recoveries		Result	Acceptance Range								
367-12-4	Surrogate: SURR: 2-Fluorophenol	30.4 %	19.7-63.1								



Sample Information

Client Sample ID: B3

York Sample ID: 22C1730-05

York Project (SDG) No.
22C1730

Client Project ID
CZ42022 MTA Property-Beacon

Matrix
Water

Collection Date/Time
March 31, 2022 8:00 am

Date Received
03/31/2022

Semi-Volatiles, NYSDEC Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
4165-62-2	Surrogate: SURR: Phenol-d5	15.1 %			10.1-41.7						
4165-60-0	Surrogate: SURR: Nitrobenzene-d5	68.7 %			50.2-113						
321-60-8	Surrogate: SURR: 2-Fluorobiphenyl	78.0 %			39.9-105						
118-79-6	Surrogate: SURR: 2,4,6-Tribromophenol	108 %			39.3-151						
1718-51-0	Surrogate: SURR: Terphenyl-d14	79.5 %			30.7-106						

Polychlorinated Biphenyls (PCB)

Log-in Notes:

Sample Notes: EXT-D

Sample Prepared by Method: EPA SW846-3510C Low Level

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND		ug/L	0.0556	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/05/2022 13:21	04/06/2022 13:39	BJ
11104-28-2	Aroclor 1221	ND		ug/L	0.0556	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/05/2022 13:21	04/06/2022 13:39	BJ
11141-16-5	Aroclor 1232	ND		ug/L	0.0556	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/05/2022 13:21	04/06/2022 13:39	BJ
53469-21-9	Aroclor 1242	ND		ug/L	0.0556	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/05/2022 13:21	04/06/2022 13:39	BJ
12672-29-6	Aroclor 1248	ND		ug/L	0.0556	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/05/2022 13:21	04/06/2022 13:39	BJ
11097-69-1	Aroclor 1254	ND		ug/L	0.0556	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/05/2022 13:21	04/06/2022 13:39	BJ
11096-82-5	Aroclor 1260	ND		ug/L	0.0556	1	EPA 8082A Certifications: NELAC-NY10854,CTDOH,NJDEP,PADEP	04/05/2022 13:21	04/06/2022 13:39	BJ
1336-36-3	* Total PCBs	ND		ug/L	0.0556	1	EPA 8082A Certifications:	04/05/2022 13:21	04/06/2022 13:39	BJ
Surrogate Recoveries		Result		Acceptance Range						
877-09-8	Surrogate: Tetrachloro-m-xylene	59.0 %			30-120					
2051-24-3	Surrogate: Decachlorobiphenyl	51.0 %			30-120					

Metals, RCRA (no Hg) by 6020

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3015A

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-38-2	Arsenic	1.17		ug/L	1.11	1	EPA 6020B Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/01/2022 08:40	04/01/2022 14:23	RTH
7440-39-3	Barium	ND		ug/L	1.11	1	EPA 6020B Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/01/2022 08:40	04/01/2022 14:23	RTH
7440-43-9	Cadmium	ND		ug/L	0.556	1	EPA 6020B Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/01/2022 08:40	04/01/2022 14:23	RTH
7440-47-3	Chromium	2.13		ug/L	1.11	1	EPA 6020B Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/01/2022 08:40	04/01/2022 14:23	RTH



Sample Information

Client Sample ID: B3

York Sample ID: 22C1730-05

York Project (SDG) No.
22C1730

Client Project ID
CZ42022 MTA Property-Beacon

Matrix
Water

Collection Date/Time
March 31, 2022 8:00 am

Date Received
03/31/2022

Metals, RCRA (no Hg) by 6020

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3015A

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-92-1	Lead	ND		ug/L	1.11	1	EPA 6020B Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/01/2022 08:40	04/01/2022 14:23	RTH
7782-49-2	Selenium	ND		ug/L	1.11	1	EPA 6020B Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/01/2022 08:40	04/01/2022 14:23	RTH
7440-22-4	Silver	ND		ug/L	1.11	1	EPA 6020B Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/01/2022 08:40	04/01/2022 14:23	RTH

Metals, RCRA (no Hg) by 6020, Dissolved

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3015A

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-38-2	Arsenic	1.37		ug/L	1.11	1	EPA 6020B Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/06/2022 11:52	04/06/2022 16:50	RTH
7440-39-3	Barium	142		ug/L	1.11	1	EPA 6020B Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/06/2022 11:52	04/06/2022 16:50	RTH
7440-43-9	Cadmium	ND		ug/L	0.556	1	EPA 6020B Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/06/2022 11:52	04/06/2022 16:50	RTH
7440-47-3	Chromium	2.09	B	ug/L	1.11	1	EPA 6020B Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/06/2022 11:52	04/06/2022 16:50	RTH
7439-92-1	Lead	ND		ug/L	1.11	1	EPA 6020B Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/06/2022 11:52	04/06/2022 16:50	RTH
7782-49-2	Selenium	3.53		ug/L	1.11	1	EPA 6020B Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/06/2022 11:52	04/06/2022 16:50	RTH
7440-22-4	Silver	ND		ug/L	1.11	1	EPA 6020B Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/06/2022 11:52	04/06/2022 16:50	RTH

Mercury by 7470/7471

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA SW846-7470A

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	0.0002		mg/L	0.0002	1	EPA 7470 Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/01/2022 18:36	04/01/2022 18:36	AA

Mercury, Dissolved

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA SW846-7470A

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND		mg/L	0.0002	1	EPA 7470 Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/31/2022 22:28	03/31/2022 22:28	AA



Sample Information

Client Sample ID: Trip Blank

York Sample ID: 22C1730-06

York Project (SDG) No.
22C1730

Client Project ID
CZ42022 MTA Property-Beacon

Matrix
Water

Collection Date/Time
March 31, 2022 8:45 am

Date Received
03/31/2022

Volatile Organics, CP-51 (STARS) Low level

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
95-63-6	1,2,4-Trimethylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/06/2022 09:00	04/06/2022 14:15	PD
108-67-8	1,3,5-Trimethylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/06/2022 09:00	04/06/2022 14:15	PD
71-43-2	Benzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/06/2022 09:00	04/06/2022 14:15	PD
100-41-4	Ethyl Benzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/06/2022 09:00	04/06/2022 14:15	PD
98-82-8	Isopropylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/06/2022 09:00	04/06/2022 14:15	PD
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/06/2022 09:00	04/06/2022 14:15	PD
91-20-3	Naphthalene	ND		ug/L	1.0	2.0	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/06/2022 09:00	04/06/2022 14:15	PD
104-51-8	n-Butylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/06/2022 09:00	04/06/2022 14:15	PD
103-65-1	n-Propylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/06/2022 09:00	04/06/2022 14:15	PD
95-47-6	o-Xylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,PADEP	04/06/2022 09:00	04/06/2022 14:15	PD
179601-23-1	p- & m- Xylenes	ND		ug/L	0.50	1.0	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,PADEP	04/06/2022 09:00	04/06/2022 14:15	PD
99-87-6	p-Isopropyltoluene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/06/2022 09:00	04/06/2022 14:15	PD
135-98-8	sec-Butylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/06/2022 09:00	04/06/2022 14:15	PD
98-06-6	tert-Butylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/06/2022 09:00	04/06/2022 14:15	PD
108-88-3	Toluene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	04/06/2022 09:00	04/06/2022 14:15	PD
1330-20-7	Xylenes, Total	ND		ug/L	0.60	1.5	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP	04/06/2022 09:00	04/06/2022 14:15	PD
Surrogate Recoveries		Result	Acceptance Range								
17060-07-0	Surrogate: SURR: 1,2-Dichloroethane-d4	103 %	69-130								
2037-26-5	Surrogate: SURR: Toluene-d8	81.4 %	81-117								
460-00-4	Surrogate: SURR: p-Bromofluorobenzene	93.2 %	79-122								



Analytical Batch Summary

Batch ID: BC23348 **Preparation Method:** EPA 3050B **Prepared By:** S_G

YORK Sample ID	Client Sample ID	Preparation Date
22C1730-01	B-3 (1-2 ft)	03/31/22
22C1730-02	B-3 (8-9 ft)	03/31/22
BC23348-BLK1	Blank	03/31/22
BC23348-DUP1	Duplicate	03/31/22
BC23348-MS1	Matrix Spike	03/31/22
BC23348-PS1	Post Spike	03/31/22
BC23348-SRM1	Reference	03/31/22

Batch ID: BC23351 **Preparation Method:** EPA SW846-7470A **Prepared By:** AA

YORK Sample ID	Client Sample ID	Preparation Date
22C1730-05	B3	03/31/22
BC23351-BLK1	Blank	03/31/22
BC23351-BS1	LCS	03/31/22
BC23351-BS2	LCS	03/31/22

Batch ID: BD20005 **Preparation Method:** EPA 3550C **Prepared By:** NN

YORK Sample ID	Client Sample ID	Preparation Date
22C1730-01	B-3 (1-2 ft)	04/01/22
22C1730-02	B-3 (8-9 ft)	04/01/22
22C1730-03	B-5 (1-2 ft)	04/01/22
22C1730-04	B-5 (3-4 ft)	04/01/22
BD20005-BLK2	Blank	04/01/22
BD20005-BS2	LCS	04/01/22
BD20005-MS2	Matrix Spike	04/01/22
BD20005-MSD2	Matrix Spike Dup	04/01/22

Batch ID: BD20012 **Preparation Method:** EPA 3015A **Prepared By:** BR

YORK Sample ID	Client Sample ID	Preparation Date
22C1730-05	B3	04/01/22
BD20012-BLK1	Blank	04/01/22
BD20012-BS1	LCS	04/01/22
BD20012-DUP1	Duplicate	04/01/22
BD20012-MS1	Matrix Spike	04/01/22

Batch ID: BD20080 **Preparation Method:** EPA SW846-7470A **Prepared By:** AA

YORK Sample ID	Client Sample ID	Preparation Date
22C1730-05	B3	04/01/22
BD20080-BLK1	Blank	04/01/22
BD20080-BS1	LCS	04/01/22



BD20080-BS2

LCS

04/01/22

Batch ID: BD20090**Preparation Method:** EPA 3550C**Prepared By:** FG

YORK Sample ID	Client Sample ID	Preparation Date
22C1730-01	B-3 (1-2 ft)	04/02/22
22C1730-02	B-3 (8-9 ft)	04/02/22
22C1730-03	B-5 (1-2 ft)	04/02/22
22C1730-04	B-5 (3-4 ft)	04/02/22
BD20090-BLK1	Blank	04/02/22
BD20090-BS1	LCS	04/02/22
BD20090-MS1	Matrix Spike	04/02/22
BD20090-MSD1	Matrix Spike Dup	04/02/22

Batch ID: BD20142**Preparation Method:** EPA 3510C**Prepared By:** GMA

YORK Sample ID	Client Sample ID	Preparation Date
22C1730-05	B3	04/04/22
BD20142-BLK1	Blank	04/04/22
BD20142-BLK2	Blank	04/04/22
BD20142-BS1	LCS	04/04/22
BD20142-BS2	LCS	04/04/22

Batch ID: BD20190**Preparation Method:** EPA 3050B**Prepared By:** S_G

YORK Sample ID	Client Sample ID	Preparation Date
22C1730-03	B-5 (1-2 ft)	04/04/22
22C1730-04	B-5 (3-4 ft)	04/04/22
BD20190-BLK1	Blank	04/04/22
BD20190-DUP1	Duplicate	04/04/22
BD20190-MS1	Matrix Spike	04/04/22
BD20190-PS1	Post Spike	04/04/22
BD20190-SRM1	Reference	04/04/22

Batch ID: BD20216**Preparation Method:** EPA SW846-3510C Low Level**Prepared By:** GMA

YORK Sample ID	Client Sample ID	Preparation Date
22C1730-05	B3	04/05/22
BD20216-BLK2	Blank	04/05/22
BD20216-BS2	LCS	04/05/22
BD20216-BSD2	LCS Dup	04/05/22

Batch ID: BD20226**Preparation Method:** EPA 5030B**Prepared By:** CLG

YORK Sample ID	Client Sample ID	Preparation Date
22C1730-05	B3	04/05/22
BD20226-BLK1	Blank	04/05/22
BD20226-BS1	LCS	04/05/22



BD20226-BSD1

LCS Dup

04/05/22

Batch ID: BD20281**Preparation Method:** % Solids Prep**Prepared By:** MEW

YORK Sample ID	Client Sample ID	Preparation Date
22C1730-01	B-3 (1-2 ft)	04/05/22
22C1730-02	B-3 (8-9 ft)	04/05/22
22C1730-03	B-5 (1-2 ft)	04/05/22
22C1730-04	B-5 (3-4 ft)	04/05/22
BD20281-DUP1	Duplicate	04/05/22

Batch ID: BD20319**Preparation Method:** EPA 5030B**Prepared By:** CLG

YORK Sample ID	Client Sample ID	Preparation Date
22C1730-06	Trip Blank	04/06/22
BD20319-BLK1	Blank	04/06/22
BD20319-BS1	LCS	04/06/22
BD20319-BSD1	LCS Dup	04/06/22

Batch ID: BD20337**Preparation Method:** EPA 3015A**Prepared By:** BR

YORK Sample ID	Client Sample ID	Preparation Date
22C1730-05	B3	04/06/22
BD20337-BLK1	Blank	04/06/22
BD20337-BS1	LCS	04/06/22
BD20337-DUP1	Duplicate	04/06/22
BD20337-MS1	Matrix Spike	04/06/22

Batch ID: BD20343**Preparation Method:** EPA 7473 soil**Prepared By:** BR

YORK Sample ID	Client Sample ID	Preparation Date
22C1730-01	B-3 (1-2 ft)	04/06/22
22C1730-02	B-3 (8-9 ft)	04/06/22
22C1730-03	B-5 (1-2 ft)	04/06/22
22C1730-04	B-5 (3-4 ft)	04/06/22
BD20343-BLK1	Blank	04/06/22
BD20343-DUP1	Duplicate	04/06/22
BD20343-MS1	Matrix Spike	04/06/22
BD20343-SRM1	Reference	04/06/22

Batch ID: BD20411**Preparation Method:** EPA 5035A**Prepared By:** FTR

YORK Sample ID	Client Sample ID	Preparation Date
22C1730-01	B-3 (1-2 ft)	04/07/22
BD20411-BLK1	Blank	04/07/22
BD20411-BLK2	Blank	04/07/22
BD20411-BS1	LCS	04/07/22
BD20411-BSD1	LCS Dup	04/07/22



Batch ID: BD20459

Preparation Method: EPA 5035A

Prepared By: FTR

YORK Sample ID	Client Sample ID	Preparation Date
22C1730-03	B-5 (1-2 ft)	04/07/22
22C1730-04	B-5 (3-4 ft)	04/07/22
BD20459-BLK1	Blank	04/07/22
BD20459-BLK2	Blank	04/07/22
BD20459-BS1	LCS	04/07/22
BD20459-BSD1	LCS Dup	04/07/22

Batch ID: BD20495

Preparation Method: EPA 5035A

Prepared By: FTR

YORK Sample ID	Client Sample ID	Preparation Date
22C1730-02	B-3 (8-9 ft)	04/08/22
BD20495-BLK1	Blank	04/08/22
BD20495-BLK2	Blank	04/08/22
BD20495-BS1	LCS	04/08/22
BD20495-BSD1	LCS Dup	04/08/22



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20226 - EPA 5030B

Blank (BD20226-BLK1)

Prepared & Analyzed: 04/05/2022

1,1,1-Trichloroethane	ND	0.50	ug/L
1,1-Dichloroethane	ND	0.50	"
1,1-Dichloroethylene	ND	0.50	"
1,2,4-Trimethylbenzene	ND	0.50	"
1,2-Dichlorobenzene	ND	0.50	"
1,2-Dichloroethane	ND	0.50	"
1,3,5-Trimethylbenzene	ND	0.50	"
1,3-Dichlorobenzene	ND	0.50	"
1,4-Dichlorobenzene	ND	0.50	"
1,4-Dioxane	ND	80	"
2-Butanone	ND	0.50	"
Acetone	ND	2.0	"
Benzene	ND	0.50	"
Carbon tetrachloride	ND	0.50	"
Chlorobenzene	ND	0.50	"
Chloroform	ND	0.50	"
cis-1,2-Dichloroethylene	ND	0.50	"
Ethyl Benzene	ND	0.50	"
Methyl tert-butyl ether (MTBE)	ND	0.50	"
Methylene chloride	ND	2.0	"
Naphthalene	ND	2.0	"
n-Butylbenzene	ND	0.50	"
n-Propylbenzene	ND	0.50	"
o-Xylene	ND	0.50	"
p- & m- Xylenes	ND	1.0	"
sec-Butylbenzene	ND	0.50	"
tert-Butylbenzene	ND	0.50	"
Tetrachloroethylene	ND	0.50	"
Toluene	ND	0.50	"
trans-1,2-Dichloroethylene	ND	0.50	"
Trichloroethylene	ND	0.50	"
Vinyl Chloride	ND	0.50	"
Xylenes, Total	ND	1.5	"

Surrogate: SURR: 1,2-Dichloroethane-d4	10.4	"	10.0	104	69-130
Surrogate: SURR: Toluene-d8	10.0	"	10.0	100	81-117
Surrogate: SURR: p-Bromofluorobenzene	10.2	"	10.0	102	79-122



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20226 - EPA 5030B

LCS (BD20226-BS1)

Prepared & Analyzed: 04/05/2022

1,1,1-Trichloroethane	9.9		ug/L	10.0		98.6	78-136				
1,1-Dichloroethane	9.7		"	10.0		97.0	82-129				
1,1-Dichloroethylene	10		"	10.0		104	68-138				
1,2,4-Trimethylbenzene	9.0		"	10.0		89.8	82-132				
1,2-Dichlorobenzene	8.8		"	10.0		88.2	79-123				
1,2-Dichloroethane	9.8		"	10.0		98.3	73-132				
1,3,5-Trimethylbenzene	8.9		"	10.0		88.7	80-131				
1,3-Dichlorobenzene	8.8		"	10.0		88.2	86-122				
1,4-Dichlorobenzene	8.9		"	10.0		88.7	85-124				
1,4-Dioxane	160		"	210		74.9	10-349				
2-Butanone	9.5		"	10.0		95.1	49-152				
Acetone	6.0		"	10.0		59.5	14-150				
Benzene	9.7		"	10.0		97.4	85-126				
Carbon tetrachloride	10		"	10.0		103	77-141				
Chlorobenzene	9.8		"	10.0		98.0	88-120				
Chloroform	9.6		"	10.0		95.8	82-128				
cis-1,2-Dichloroethylene	9.7		"	10.0		97.1	83-129				
Ethyl Benzene	9.6		"	10.0		96.1	80-131				
Methyl tert-butyl ether (MTBE)	9.5		"	10.0		95.1	76-135				
Methylene chloride	8.5		"	10.0		84.7	55-137				
Naphthalene	8.4		"	10.0		84.1	70-147				
n-Butylbenzene	8.0		"	10.0		80.1	79-132				
n-Propylbenzene	9.2		"	10.0		91.9	78-133				
o-Xylene	9.5		"	10.0		95.1	78-130				
p- & m- Xylenes	20		"	20.0		98.4	77-133				
sec-Butylbenzene	8.9		"	10.0		88.9	79-137				
tert-Butylbenzene	9.0		"	10.0		89.5	77-138				
Tetrachloroethylene	5.7		"	10.0		56.7	82-131	Low Bias			
Toluene	9.4		"	10.0		94.1	80-127				
trans-1,2-Dichloroethylene	10		"	10.0		101	80-132				
Trichloroethylene	9.1		"	10.0		91.2	82-128				
Vinyl Chloride	10		"	10.0		102	58-145				
Surrogate: SURR: 1,2-Dichloroethane-d4	10.2		"	10.0		102	69-130				
Surrogate: SURR: Toluene-d8	9.93		"	10.0		99.3	81-117				
Surrogate: SURR: p-Bromofluorobenzene	10.0		"	10.0		100	79-122				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20226 - EPA 5030B

LCS Dup (BD20226-BSD1)

Prepared & Analyzed: 04/05/2022

1,1,1-Trichloroethane	9.7		ug/L	10.0		96.9	78-136		1.74	30	
1,1-Dichloroethane	9.5		"	10.0		95.4	82-129		1.66	30	
1,1-Dichloroethylene	10		"	10.0		100	68-138		3.91	30	
1,2,4-Trimethylbenzene	8.8		"	10.0		88.4	82-132		1.57	30	
1,2-Dichlorobenzene	8.7		"	10.0		87.0	79-123		1.37	30	
1,2-Dichloroethane	9.7		"	10.0		96.8	73-132		1.54	30	
1,3,5-Trimethylbenzene	8.8		"	10.0		87.6	80-131		1.25	30	
1,3-Dichlorobenzene	8.7		"	10.0		86.6	86-122		1.83	30	
1,4-Dichlorobenzene	8.7		"	10.0		86.9	85-124		2.05	30	
1,4-Dioxane	160		"	210		76.3	10-349		1.82	30	
2-Butanone	9.1		"	10.0		91.4	49-152		3.97	30	
Acetone	6.0		"	10.0		60.0	14-150		0.837	30	
Benzene	9.6		"	10.0		95.7	85-126		1.76	30	
Carbon tetrachloride	10		"	10.0		100	77-141		2.76	30	
Chlorobenzene	9.6		"	10.0		96.4	88-120		1.65	30	
Chloroform	9.5		"	10.0		94.6	82-128		1.26	30	
cis-1,2-Dichloroethylene	9.6		"	10.0		95.6	83-129		1.56	30	
Ethyl Benzene	9.4		"	10.0		93.5	80-131		2.74	30	
Methyl tert-butyl ether (MTBE)	9.5		"	10.0		95.3	76-135		0.210	30	
Methylene chloride	9.2		"	10.0		91.8	55-137		8.05	30	
Naphthalene	8.5		"	10.0		85.0	70-147		1.06	30	
n-Butylbenzene	7.9		"	10.0		79.3	79-132		1.00	30	
n-Propylbenzene	9.0		"	10.0		90.0	78-133		2.09	30	
o-Xylene	9.4		"	10.0		93.6	78-130		1.59	30	
p- & m- Xylenes	19		"	20.0		96.6	77-133		1.85	30	
sec-Butylbenzene	8.8		"	10.0		88.3	79-137		0.677	30	
tert-Butylbenzene	8.8		"	10.0		88.2	77-138		1.46	30	
Tetrachloroethylene	5.5		"	10.0		54.9	82-131	Low Bias	3.23	30	
Toluene	9.2		"	10.0		92.2	80-127		2.04	30	
trans-1,2-Dichloroethylene	9.7		"	10.0		97.3	80-132		3.63	30	
Trichloroethylene	8.8		"	10.0		88.2	82-128		3.34	30	
Vinyl Chloride	9.8		"	10.0		97.6	58-145		3.92	30	
Surrogate: SURR: 1,2-Dichloroethane-d4	10.4		"	10.0		104	69-130				
Surrogate: SURR: Toluene-d8	9.96		"	10.0		99.6	81-117				
Surrogate: SURR: p-Bromofluorobenzene	10.0		"	10.0		100	79-122				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20319 - EPA 5030B

Blank (BD20319-BLK1)

Prepared & Analyzed: 04/06/2022

1,2,4-Trimethylbenzene	ND	0.50	ug/L
1,3,5-Trimethylbenzene	ND	0.50	"
Benzene	ND	0.50	"
Ethyl Benzene	ND	0.50	"
Isopropylbenzene	ND	0.50	"
Methyl tert-butyl ether (MTBE)	ND	0.50	"
Naphthalene	ND	2.0	"
n-Butylbenzene	ND	0.50	"
n-Propylbenzene	ND	0.50	"
o-Xylene	ND	0.50	"
p- & m- Xylenes	ND	1.0	"
p-Isopropyltoluene	ND	0.50	"
sec-Butylbenzene	ND	0.50	"
tert-Butylbenzene	ND	0.50	"
Toluene	ND	0.50	"
Xylenes, Total	ND	1.5	"

Surrogate: SURR: 1,2-Dichloroethane-d4	10.5	"	10.0	105	69-130
Surrogate: SURR: Toluene-d8	10.4	"	10.0	104	81-117
Surrogate: SURR: p-Bromofluorobenzene	10.1	"	10.0	101	79-122

LCS (BD20319-BS1)

Prepared & Analyzed: 04/06/2022

1,2,4-Trimethylbenzene	11	ug/L	10.0	108	82-132
1,3,5-Trimethylbenzene	11	"	10.0	106	80-131
Benzene	9.2	"	10.0	91.8	85-126
Ethyl Benzene	10	"	10.0	102	80-131
Isopropylbenzene	11	"	10.0	114	76-140
Methyl tert-butyl ether (MTBE)	8.2	"	10.0	82.5	76-135
Naphthalene	10	"	10.0	103	70-147
n-Butylbenzene	11	"	10.0	107	79-132
n-Propylbenzene	11	"	10.0	112	78-133
o-Xylene	10	"	10.0	102	78-130
p- & m- Xylenes	21	"	20.0	106	77-133
p-Isopropyltoluene	11	"	10.0	109	81-136
sec-Butylbenzene	11	"	10.0	110	79-137
tert-Butylbenzene	11	"	10.0	111	77-138
Toluene	10	"	10.0	102	80-127

Surrogate: SURR: 1,2-Dichloroethane-d4	9.14	"	10.0	91.4	69-130
Surrogate: SURR: Toluene-d8	10.7	"	10.0	107	81-117
Surrogate: SURR: p-Bromofluorobenzene	10.2	"	10.0	102	79-122



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20319 - EPA 5030B

LCS Dup (BD20319-BSD1)

Prepared & Analyzed: 04/06/2022

1,2,4-Trimethylbenzene	10		ug/L	10.0		99.6	82-132		8.37	30	
1,3,5-Trimethylbenzene	9.8		"	10.0		98.5	80-131		7.62	30	
Benzene	8.7		"	10.0		87.2	85-126		5.14	30	
Ethyl Benzene	9.4		"	10.0		94.4	80-131		8.03	30	
Isopropylbenzene	10		"	10.0		103	76-140		10.7	30	
Methyl tert-butyl ether (MTBE)	8.5		"	10.0		85.0	76-135		2.99	30	
Naphthalene	10		"	10.0		100	70-147		2.27	30	
n-Butylbenzene	9.9		"	10.0		99.2	79-132		7.29	30	
n-Propylbenzene	10		"	10.0		101	78-133		10.3	30	
o-Xylene	9.6		"	10.0		95.8	78-130		6.27	30	
p- & m- Xylenes	20		"	20.0		97.6	77-133		8.20	30	
p-Isopropyltoluene	10		"	10.0		101	81-136		7.71	30	
sec-Butylbenzene	10		"	10.0		100	79-137		9.71	30	
tert-Butylbenzene	10		"	10.0		101	77-138		9.65	30	
Toluene	9.4		"	10.0		93.9	80-127		8.07	30	
Surrogate: SURR: 1,2-Dichloroethane-d4	9.66		"	10.0		96.6	69-130				
Surrogate: SURR: Toluene-d8	10.4		"	10.0		104	81-117				
Surrogate: SURR: p-Bromofluorobenzene	10.2		"	10.0		102	79-122				

Batch BD20411 - EPA 5035A

Blank (BD20411-BLK1)

Prepared & Analyzed: 04/07/2022

1,2,4-Trimethylbenzene	ND	0.0050	mg/kg wet								
1,3,5-Trimethylbenzene	ND	0.0050	"								
Benzene	ND	0.0050	"								
Ethyl Benzene	ND	0.0050	"								
Isopropylbenzene	ND	0.0050	"								
Methyl tert-butyl ether (MTBE)	ND	0.0050	"								
Naphthalene	ND	0.010	"								
n-Butylbenzene	ND	0.0050	"								
n-Propylbenzene	ND	0.0050	"								
o-Xylene	ND	0.0050	"								
p- & m- Xylenes	ND	0.0050	"								
p-Isopropyltoluene	ND	0.0050	"								
sec-Butylbenzene	ND	0.0050	"								
tert-Butylbenzene	ND	0.0050	"								
Toluene	ND	0.0050	"								
Xylenes, Total	ND	0.0050	"								
Surrogate: SURR: 1,2-Dichloroethane-d4	50.4		ug/L	50.0		101	77-125				
Surrogate: SURR: Toluene-d8	48.0		"	50.0		96.1	85-120				
Surrogate: SURR: p-Bromofluorobenzene	47.6		"	50.0		95.2	76-130				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20411 - EPA 5035A

Blank (BD20411-BLK2)

Prepared & Analyzed: 04/07/2022

1,2,4-Trimethylbenzene	ND	0.50	mg/kg wet
1,3,5-Trimethylbenzene	ND	0.50	"
Benzene	ND	0.50	"
Ethyl Benzene	ND	0.50	"
Isopropylbenzene	ND	0.50	"
Methyl tert-butyl ether (MTBE)	ND	0.50	"
Naphthalene	ND	1.0	"
n-Butylbenzene	ND	0.50	"
n-Propylbenzene	ND	0.50	"
o-Xylene	ND	0.50	"
p- & m- Xylenes	ND	0.50	"
p-Isopropyltoluene	ND	0.50	"
sec-Butylbenzene	ND	0.50	"
tert-Butylbenzene	ND	0.50	"
Toluene	ND	0.50	"
Xylenes, Total	ND	0.50	"

Surrogate: SURR: 1,2-Dichloroethane-d4	49.8	ug/L	50.0	99.7	77-125
Surrogate: SURR: Toluene-d8	47.9	"	50.0	95.7	85-120
Surrogate: SURR: p-Bromofluorobenzene	47.6	"	50.0	95.3	76-130

LCS (BD20411-BS1)

Prepared & Analyzed: 04/07/2022

1,2,4-Trimethylbenzene	44	ug/L	50.0	87.1	84-125
1,3,5-Trimethylbenzene	43	"	50.0	85.5	82-126
Benzene	46	"	50.0	92.7	77-127
Ethyl Benzene	45	"	50.0	89.1	84-125
Isopropylbenzene	44	"	50.0	87.2	81-127
Methyl tert-butyl ether (MTBE)	44	"	50.0	88.0	74-131
Naphthalene	44	"	50.0	88.8	86-141
n-Butylbenzene	41	"	50.0	81.9	80-130
n-Propylbenzene	42	"	50.0	83.3	74-136
o-Xylene	46	"	50.0	92.2	83-123
p- & m- Xylenes	90	"	100	90.4	82-128
p-Isopropyltoluene	43	"	50.0	86.2	85-125
sec-Butylbenzene	42	"	50.0	84.0	83-125
tert-Butylbenzene	40	"	50.0	80.8	80-127
Toluene	44	"	50.0	88.0	85-121

Surrogate: SURR: 1,2-Dichloroethane-d4	49.8	"	50.0	99.5	77-125
Surrogate: SURR: Toluene-d8	48.6	"	50.0	97.2	85-120
Surrogate: SURR: p-Bromofluorobenzene	47.8	"	50.0	95.7	76-130



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20411 - EPA 5035A

LCS Dup (BD20411-BSD1)

Prepared & Analyzed: 04/07/2022

1,2,4-Trimethylbenzene	46		ug/L	50.0		92.7	84-125		6.21	30	
1,3,5-Trimethylbenzene	46		"	50.0		91.5	82-126		6.83	30	
Benzene	49		"	50.0		98.1	77-127		5.74	30	
Ethyl Benzene	48		"	50.0		95.6	84-125		7.06	30	
Isopropylbenzene	47		"	50.0		94.6	81-127		8.16	30	
Methyl tert-butyl ether (MTBE)	51		"	50.0		102	74-131		14.4	30	
Naphthalene	45		"	50.0		90.7	86-141		2.16	30	
n-Butylbenzene	44		"	50.0		88.5	80-130		7.75	30	
n-Propylbenzene	45		"	50.0		90.5	74-136		8.26	30	
o-Xylene	49		"	50.0		98.3	83-123		6.47	30	
p- & m- Xylenes	96		"	100		96.2	82-128		6.11	30	
p-Isopropyltoluene	47		"	50.0		93.3	85-125		7.89	30	
sec-Butylbenzene	46		"	50.0		91.0	83-125		8.05	30	
tert-Butylbenzene	43		"	50.0		86.8	80-127		7.16	30	
Toluene	47		"	50.0		93.6	85-121		6.23	30	
Surrogate: SURR: 1,2-Dichloroethane-d4	49.3		"	50.0		98.6	77-125				
Surrogate: SURR: Toluene-d8	48.4		"	50.0		96.8	85-120				
Surrogate: SURR: p-Bromofluorobenzene	48.1		"	50.0		96.2	76-130				

Batch BD20459 - EPA 5035A

Blank (BD20459-BLK1)

Prepared & Analyzed: 04/07/2022

1,1,1-Trichloroethane	ND	0.0050	mg/kg wet
1,1-Dichloroethane	ND	0.0050	"
1,1-Dichloroethylene	ND	0.0050	"
1,2,4-Trimethylbenzene	ND	0.0050	"
1,2,4-Trimethylbenzene	ND	0.0050	"
1,2-Dichlorobenzene	ND	0.0050	"
1,2-Dichloroethane	ND	0.0050	"
1,3,5-Trimethylbenzene	ND	0.0050	"
1,3,5-Trimethylbenzene	ND	0.0050	"
1,3-Dichlorobenzene	ND	0.0050	"
1,4-Dichlorobenzene	ND	0.0050	"
1,4-Dioxane	ND	0.10	"
2-Butanone	ND	0.0050	"
Acetone	ND	0.010	"
Benzene	ND	0.0050	"
Benzene	ND	0.0050	"
Carbon tetrachloride	ND	0.0050	"
Chlorobenzene	ND	0.0050	"
Chloroform	ND	0.0050	"
cis-1,2-Dichloroethylene	ND	0.0050	"
Ethyl Benzene	ND	0.0050	"
Ethyl Benzene	ND	0.0050	"
Isopropylbenzene	ND	0.0050	"
Methyl tert-butyl ether (MTBE)	ND	0.0050	"
Methyl tert-butyl ether (MTBE)	ND	0.0050	"
Methylene chloride	0.0072	0.010	"
Naphthalene	ND	0.010	"
Naphthalene	ND	0.010	"
n-Butylbenzene	ND	0.0050	"



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20459 - EPA 5035A

Blank (BD20459-BLK1)

Prepared & Analyzed: 04/07/2022

n-Butylbenzene	ND	0.0050	mg/kg wet								
n-Propylbenzene	ND	0.0050	"								
n-Propylbenzene	ND	0.0050	"								
o-Xylene	ND	0.0050	"								
o-Xylene	ND	0.0050	"								
p- & m- Xylenes	ND	0.0050	"								
p- & m- Xylenes	ND	0.010	"								
p-Isopropyltoluene	ND	0.0050	"								
sec-Butylbenzene	ND	0.0050	"								
sec-Butylbenzene	ND	0.0050	"								
tert-Butylbenzene	ND	0.0050	"								
tert-Butylbenzene	ND	0.0050	"								
Tetrachloroethylene	ND	0.0050	"								
Toluene	ND	0.0050	"								
Toluene	ND	0.0050	"								
trans-1,2-Dichloroethylene	ND	0.0050	"								
Trichloroethylene	ND	0.0050	"								
Vinyl Chloride	ND	0.0050	"								
Xylenes, Total	ND	0.015	"								
Xylenes, Total	ND	0.0050	"								
Surrogate: SURR: 1,2-Dichloroethane-d4	49.9		ug/L	50.0		99.8	77-125				
Surrogate: SURR: 1,2-Dichloroethane-d4	49.9		"	50.0		99.8	77-125				
Surrogate: SURR: Toluene-d8	48.7		"	50.0		97.3	85-120				
Surrogate: SURR: Toluene-d8	48.7		"	50.0		97.3	85-120				
Surrogate: SURR: p-Bromofluorobenzene	48.4		"	50.0		96.8	76-130				
Surrogate: SURR: p-Bromofluorobenzene	48.4		"	50.0		96.8	76-130				

Blank (BD20459-BLK2)

Prepared & Analyzed: 04/07/2022

1,1,1-Trichloroethane	ND	0.50	mg/kg wet								
1,1-Dichloroethane	ND	0.50	"								
1,1-Dichloroethylene	ND	0.50	"								
1,2,4-Trimethylbenzene	ND	0.50	"								
1,2,4-Trimethylbenzene	ND	0.50	"								
1,2-Dichlorobenzene	ND	0.50	"								
1,2-Dichloroethane	ND	0.50	"								
1,3,5-Trimethylbenzene	ND	0.50	"								
1,3,5-Trimethylbenzene	ND	0.50	"								
1,3-Dichlorobenzene	ND	0.50	"								
1,4-Dichlorobenzene	ND	0.50	"								
1,4-Dioxane	ND	10	"								
2-Butanone	ND	0.50	"								
Acetone	ND	1.0	"								
Benzene	ND	0.50	"								
Benzene	ND	0.50	"								
Carbon tetrachloride	ND	0.50	"								
Chlorobenzene	ND	0.50	"								
Chloroform	ND	0.50	"								
cis-1,2-Dichloroethylene	ND	0.50	"								
Ethyl Benzene	ND	0.50	"								
Ethyl Benzene	ND	0.50	"								
Isopropylbenzene	ND	0.50	"								



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20459 - EPA 5035A

Blank (BD20459-BLK2)

Prepared & Analyzed: 04/07/2022

Methyl tert-butyl ether (MTBE)	ND	0.50	mg/kg wet
Methyl tert-butyl ether (MTBE)	ND	0.50	"
Methylene chloride	0.57	1.0	"
Naphthalene	ND	1.0	"
Naphthalene	ND	1.0	"
n-Butylbenzene	ND	0.50	"
n-Butylbenzene	ND	0.50	"
n-Propylbenzene	ND	0.50	"
n-Propylbenzene	ND	0.50	"
o-Xylene	ND	0.50	"
o-Xylene	ND	0.50	"
p- & m- Xylenes	ND	0.50	"
p- & m- Xylenes	ND	1.0	"
p-Isopropyltoluene	ND	0.50	"
sec-Butylbenzene	ND	0.50	"
sec-Butylbenzene	ND	0.50	"
tert-Butylbenzene	ND	0.50	"
tert-Butylbenzene	ND	0.50	"
Tetrachloroethylene	ND	0.50	"
Toluene	ND	0.50	"
Toluene	ND	0.50	"
trans-1,2-Dichloroethylene	ND	0.50	"
Trichloroethylene	ND	0.50	"
Vinyl Chloride	ND	0.50	"
Xylenes, Total	ND	1.5	"
Xylenes, Total	ND	0.50	"

Surrogate: SURR: 1,2-Dichloroethane-d4	51.0	ug/L	50.0	102	77-125
Surrogate: SURR: 1,2-Dichloroethane-d4	51.0	"	50.0	102	77-125
Surrogate: SURR: Toluene-d8	48.3	"	50.0	96.6	85-120
Surrogate: SURR: Toluene-d8	48.3	"	50.0	96.6	85-120
Surrogate: SURR: p-Bromofluorobenzene	47.5	"	50.0	94.9	76-130
Surrogate: SURR: p-Bromofluorobenzene	47.5	"	50.0	94.9	76-130



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BD20459 - EPA 5035A											
LCS (BD20459-BS1)						Prepared & Analyzed: 04/07/2022					
1,1,1-Trichloroethane	61		ug/L	50.0		122	71-137				
1,1-Dichloroethane	46		"	50.0		91.4	75-130				
1,1-Dichloroethylene	45		"	50.0		89.6	64-137				
1,2,4-Trimethylbenzene	47		"	50.0		94.0	84-125				
1,2,4-Trimethylbenzene	47		"	50.0		94.0	84-125				
1,2-Dichlorobenzene	48		"	50.0		95.3	85-122				
1,2-Dichloroethane	58		"	50.0		117	71-133				
1,3,5-Trimethylbenzene	47		"	50.0		94.0	82-126				
1,3,5-Trimethylbenzene	47		"	50.0		94.0	82-126				
1,3-Dichlorobenzene	46		"	50.0		92.1	84-124				
1,4-Dichlorobenzene	46		"	50.0		92.4	84-124				
1,4-Dioxane	640		"	1050		61.0	10-228				
2-Butanone	34		"	50.0		67.6	58-147				
Acetone	24		"	50.0		48.3	36-155				
Benzene	47		"	50.0		93.5	77-127				
Benzene	47		"	50.0		93.5	77-127				
Carbon tetrachloride	64		"	50.0		129	66-143				
Chlorobenzene	50		"	50.0		101	86-120				
Chloroform	55		"	50.0		109	76-131				
cis-1,2-Dichloroethylene	48		"	50.0		96.6	74-132				
Ethyl Benzene	49		"	50.0		97.2	84-125				
Ethyl Benzene	49		"	50.0		97.2	84-125				
Isopropylbenzene	49		"	50.0		97.8	81-127				
Methyl tert-butyl ether (MTBE)	53		"	50.0		105	74-131				
Methyl tert-butyl ether (MTBE)	53		"	50.0		105	74-131				
Methylene chloride	53		"	50.0		106	57-141				
Naphthalene	44		"	50.0		88.6	86-141				
Naphthalene	44		"	50.0		88.6	86-141				
n-Butylbenzene	45		"	50.0		90.1	80-130				
n-Butylbenzene	45		"	50.0		90.1	80-130				
n-Propylbenzene	46		"	50.0		92.8	74-136				
n-Propylbenzene	46		"	50.0		92.8	74-136				
o-Xylene	50		"	50.0		99.6	83-123				
o-Xylene	50		"	50.0		99.6	83-123				
p- & m- Xylenes	98		"	100		98.3	82-128				
p- & m- Xylenes	98		"	100		98.3	82-128				
p-Isopropyltoluene	48		"	50.0		95.1	85-125				
sec-Butylbenzene	47		"	50.0		93.7	83-125				
sec-Butylbenzene	47		"	50.0		93.7	83-125				
tert-Butylbenzene	45		"	50.0		89.4	80-127				
tert-Butylbenzene	45		"	50.0		89.4	80-127				
Tetrachloroethylene	38		"	50.0		76.7	80-129	Low Bias			
Toluene	48		"	50.0		96.9	85-121				
Toluene	48		"	50.0		96.9	85-121				
trans-1,2-Dichloroethylene	47		"	50.0		94.1	72-132				
Trichloroethylene	44		"	50.0		88.9	84-123				
Vinyl Chloride	42		"	50.0		84.3	52-130				
Surrogate: SURR: 1,2-Dichloroethane-d4	58.6		"	50.0		117	77-125				
Surrogate: SURR: 1,2-Dichloroethane-d4	58.6		"	50.0		117	77-125				
Surrogate: SURR: Toluene-d8	48.7		"	50.0		97.4	85-120				
Surrogate: SURR: Toluene-d8	48.7		"	50.0		97.4	85-120				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BD20459 - EPA 5035A											
LCS (BD20459-BS1)						Prepared & Analyzed: 04/07/2022					
Surrogate: SURR: p-Bromofluorobenzene	48.7		ug/L	50.0		97.4	76-130				
Surrogate: SURR: p-Bromofluorobenzene	48.7		"	50.0		97.4	76-130				
LCS Dup (BD20459-BSD1)						Prepared & Analyzed: 04/07/2022					
1,1,1-Trichloroethane	55		ug/L	50.0		110	71-137		10.8	30	
1,1-Dichloroethane	43		"	50.0		85.4	75-130		6.85	30	
1,1-Dichloroethylene	40		"	50.0		80.4	64-137		10.8	30	
1,2,4-Trimethylbenzene	50		"	50.0		99.5	84-125		5.69	30	
1,2,4-Trimethylbenzene	50		"	50.0		99.5	84-125		5.69	30	
1,2-Dichlorobenzene	49		"	50.0		97.1	85-122		1.85	30	
1,2-Dichloroethane	49		"	50.0		98.3	71-133		17.0	30	
1,3,5-Trimethylbenzene	50		"	50.0		99.8	82-126		5.98	30	
1,3,5-Trimethylbenzene	50		"	50.0		99.8	82-126		5.98	30	
1,3-Dichlorobenzene	49		"	50.0		98.1	84-124		6.27	30	
1,4-Dichlorobenzene	49		"	50.0		97.3	84-124		5.08	30	
1,4-Dioxane	670		"	1050		64.0	10-228		4.84	30	
2-Butanone	38		"	50.0		76.5	58-147		12.4	30	
Acetone	20		"	50.0		40.7	36-155		17.1	30	
Benzene	53		"	50.0		105	77-127		11.9	30	
Benzene	53		"	50.0		105	77-127		11.9	30	
Carbon tetrachloride	57		"	50.0		113	66-143		13.0	30	
Chlorobenzene	52		"	50.0		104	86-120		3.41	30	
Chloroform	53		"	50.0		107	76-131		2.34	30	
cis-1,2-Dichloroethylene	51		"	50.0		102	74-132		4.99	30	
Ethyl Benzene	52		"	50.0		103	84-125		5.85	30	
Ethyl Benzene	52		"	50.0		103	84-125		5.85	30	
Isopropylbenzene	52		"	50.0		104	81-127		6.37	30	
Methyl tert-butyl ether (MTBE)	45		"	50.0		89.9	74-131		15.5	30	
Methyl tert-butyl ether (MTBE)	45		"	50.0		89.9	74-131		15.5	30	
Methylene chloride	45		"	50.0		90.0	57-141		16.2	30	
Naphthalene	44		"	50.0		88.5	86-141		0.158	30	
Naphthalene	44		"	50.0		88.5	86-141		0.158	30	
n-Butylbenzene	49		"	50.0		97.8	80-130		8.13	30	
n-Butylbenzene	49		"	50.0		97.8	80-130		8.13	30	
n-Propylbenzene	50		"	50.0		99.2	74-136		6.65	30	
n-Propylbenzene	50		"	50.0		99.2	74-136		6.65	30	
o-Xylene	52		"	50.0		104	83-123		4.42	30	
o-Xylene	52		"	50.0		104	83-123		4.42	30	
p- & m- Xylenes	100		"	100		104	82-128		5.20	30	
p- & m- Xylenes	100		"	100		104	82-128		5.20	30	
p-Isopropyltoluene	51		"	50.0		102	85-125		6.96	30	
sec-Butylbenzene	51		"	50.0		101	83-125		7.75	30	
sec-Butylbenzene	51		"	50.0		101	83-125		7.75	30	
tert-Butylbenzene	48		"	50.0		95.2	80-127		6.26	30	
tert-Butylbenzene	48		"	50.0		95.2	80-127		6.26	30	
Tetrachloroethylene	41		"	50.0		82.2	80-129		6.82	30	
Toluene	50		"	50.0		101	85-121		4.05	30	
Toluene	50		"	50.0		101	85-121		4.05	30	
trans-1,2-Dichloroethylene	43		"	50.0		85.3	72-132		9.81	30	
Trichloroethylene	54		"	50.0		108	84-123		19.0	30	
Vinyl Chloride	36		"	50.0		72.3	52-130		15.4	30	



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20459 - EPA 5035A

LCS Dup (BD20459-BSD1)

Prepared & Analyzed: 04/07/2022

Surrogate: SURR: 1,2-Dichloroethane-d4	48.4		ug/L	50.0		96.9	77-125			
Surrogate: SURR: 1,2-Dichloroethane-d4	48.4		"	50.0		96.9	77-125			
Surrogate: SURR: Toluene-d8	48.5		"	50.0		97.1	85-120			
Surrogate: SURR: Toluene-d8	48.5		"	50.0		97.1	85-120			
Surrogate: SURR: p-Bromofluorobenzene	48.8		"	50.0		97.6	76-130			
Surrogate: SURR: p-Bromofluorobenzene	48.8		"	50.0		97.6	76-130			

Batch BD20495 - EPA 5035A

Blank (BD20495-BLK1)

Prepared & Analyzed: 04/08/2022

1,1,1-Trichloroethane	ND	0.0050	mg/kg wet							
1,1-Dichloroethane	ND	0.0050	"							
1,1-Dichloroethylene	ND	0.0050	"							
1,2,4-Trimethylbenzene	ND	0.0050	"							
1,2-Dichlorobenzene	ND	0.0050	"							
1,2-Dichloroethane	ND	0.0050	"							
1,3,5-Trimethylbenzene	ND	0.0050	"							
1,3-Dichlorobenzene	ND	0.0050	"							
1,4-Dichlorobenzene	ND	0.0050	"							
1,4-Dioxane	ND	0.10	"							
2-Butanone	ND	0.0050	"							
Acetone	ND	0.010	"							
Benzene	ND	0.0050	"							
Carbon tetrachloride	ND	0.0050	"							
Chlorobenzene	ND	0.0050	"							
Chloroform	ND	0.0050	"							
cis-1,2-Dichloroethylene	ND	0.0050	"							
Ethyl Benzene	ND	0.0050	"							
Methyl tert-butyl ether (MTBE)	ND	0.0050	"							
Methylene chloride	ND	0.010	"							
Naphthalene	ND	0.010	"							
n-Butylbenzene	ND	0.0050	"							
n-Propylbenzene	ND	0.0050	"							
o-Xylene	ND	0.0050	"							
p- & m- Xylenes	ND	0.010	"							
sec-Butylbenzene	ND	0.0050	"							
tert-Butylbenzene	ND	0.0050	"							
Tetrachloroethylene	ND	0.0050	"							
Toluene	ND	0.0050	"							
trans-1,2-Dichloroethylene	ND	0.0050	"							
Trichloroethylene	ND	0.0050	"							
Vinyl Chloride	ND	0.0050	"							
Xylenes, Total	ND	0.015	"							

Surrogate: SURR: 1,2-Dichloroethane-d4	50.3		ug/L	50.0		101	77-125			
Surrogate: SURR: Toluene-d8	51.8		"	50.0		104	85-120			
Surrogate: SURR: p-Bromofluorobenzene	48.7		"	50.0		97.4	76-130			



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20495 - EPA 5035A

Blank (BD20495-BLK2)

Prepared & Analyzed: 04/08/2022

1,1,1-Trichloroethane	ND	0.50	mg/kg wet								
1,1-Dichloroethane	ND	0.50	"								
1,1-Dichloroethylene	ND	0.50	"								
1,2,4-Trimethylbenzene	ND	0.50	"								
1,2-Dichlorobenzene	ND	0.50	"								
1,2-Dichloroethane	ND	0.50	"								
1,3,5-Trimethylbenzene	ND	0.50	"								
1,3-Dichlorobenzene	ND	0.50	"								
1,4-Dichlorobenzene	ND	0.50	"								
1,4-Dioxane	ND	10	"								
2-Butanone	ND	0.50	"								
Acetone	ND	1.0	"								
Benzene	ND	0.50	"								
Carbon tetrachloride	ND	0.50	"								
Chlorobenzene	ND	0.50	"								
Chloroform	ND	0.50	"								
cis-1,2-Dichloroethylene	ND	0.50	"								
Ethyl Benzene	ND	0.50	"								
Methyl tert-butyl ether (MTBE)	ND	0.50	"								
Methylene chloride	ND	1.0	"								
Naphthalene	ND	1.0	"								
n-Butylbenzene	ND	0.50	"								
n-Propylbenzene	ND	0.50	"								
o-Xylene	ND	0.50	"								
p- & m- Xylenes	ND	1.0	"								
sec-Butylbenzene	ND	0.50	"								
tert-Butylbenzene	ND	0.50	"								
Tetrachloroethylene	ND	0.50	"								
Toluene	ND	0.50	"								
trans-1,2-Dichloroethylene	ND	0.50	"								
Trichloroethylene	ND	0.50	"								
Vinyl Chloride	ND	0.50	"								
Xylenes, Total	ND	1.5	"								
Surrogate: SURR: 1,2-Dichloroethane-d4	52.2		ug/L	50.0		104	77-125				
Surrogate: SURR: Toluene-d8	51.8		"	50.0		104	85-120				
Surrogate: SURR: p-Bromofluorobenzene	48.5		"	50.0		97.0	76-130				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20495 - EPA 5035A

LCS (BD20495-BS1)

Prepared & Analyzed: 04/08/2022

1,1,1-Trichloroethane	41		ug/L	50.0		82.0	71-137				
1,1-Dichloroethane	38		"	50.0		77.0	75-130				
1,1-Dichloroethylene	39		"	50.0		77.3	64-137				
1,2,4-Trimethylbenzene	48		"	50.0		95.4	84-125				
1,2-Dichlorobenzene	49		"	50.0		97.3	85-122				
1,2-Dichloroethane	44		"	50.0		88.0	71-133				
1,3,5-Trimethylbenzene	47		"	50.0		93.1	82-126				
1,3-Dichlorobenzene	48		"	50.0		97.0	84-124				
1,4-Dichlorobenzene	49		"	50.0		98.8	84-124				
1,4-Dioxane	1100		"	1050		103	10-228				
2-Butanone	44		"	50.0		88.7	58-147				
Acetone	34		"	50.0		68.7	36-155				
Benzene	40		"	50.0		80.4	77-127				
Carbon tetrachloride	43		"	50.0		85.0	66-143				
Chlorobenzene	48		"	50.0		95.8	86-120				
Chloroform	42		"	50.0		84.3	76-131				
cis-1,2-Dichloroethylene	40		"	50.0		80.2	74-132				
Ethyl Benzene	47		"	50.0		93.4	84-125				
Methyl tert-butyl ether (MTBE)	43		"	50.0		86.7	74-131				
Methylene chloride	40		"	50.0		79.4	57-141				
Naphthalene	46		"	50.0		92.3	86-141				
n-Butylbenzene	48		"	50.0		96.9	80-130				
n-Propylbenzene	46		"	50.0		91.4	74-136				
o-Xylene	49		"	50.0		97.8	83-123				
p- & m- Xylenes	97		"	100		97.3	82-128				
sec-Butylbenzene	47		"	50.0		94.0	83-125				
tert-Butylbenzene	47		"	50.0		93.4	80-127				
Tetrachloroethylene	36		"	50.0		72.7	80-129	Low Bias			
Toluene	44		"	50.0		88.7	85-121				
trans-1,2-Dichloroethylene	39		"	50.0		77.6	72-132				
Trichloroethylene	43		"	50.0		86.0	84-123				
Vinyl Chloride	41		"	50.0		81.1	52-130				
Surrogate: SURR: 1,2-Dichloroethane-d4	51.2		"	50.0		102	77-125				
Surrogate: SURR: Toluene-d8	52.3		"	50.0		105	85-120				
Surrogate: SURR: p-Bromofluorobenzene	47.4		"	50.0		94.8	76-130				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20495 - EPA 5035A

LCS Dup (BD20495-BSD1)

Prepared & Analyzed: 04/08/2022

1,1,1-Trichloroethane	40		ug/L	50.0		79.8	71-137		2.65	30	
1,1-Dichloroethane	38		"	50.0		76.9	75-130		0.104	30	
1,1-Dichloroethylene	38		"	50.0		76.7	64-137		0.805	30	
1,2,4-Trimethylbenzene	46		"	50.0		93.0	84-125		2.59	30	
1,2-Dichlorobenzene	47		"	50.0		94.7	85-122		2.69	30	
1,2-Dichloroethane	43		"	50.0		86.0	71-133		2.37	30	
1,3,5-Trimethylbenzene	45		"	50.0		90.5	82-126		2.81	30	
1,3-Dichlorobenzene	47		"	50.0		94.2	84-124		2.85	30	
1,4-Dichlorobenzene	48		"	50.0		95.6	84-124		3.23	30	
1,4-Dioxane	1100		"	1050		101	10-228		1.27	30	
2-Butanone	43		"	50.0		85.1	58-147		4.19	30	
Acetone	33		"	50.0		66.9	36-155		2.63	30	
Benzene	40		"	50.0		81.0	77-127		0.694	30	
Carbon tetrachloride	41		"	50.0		82.3	66-143		3.27	30	
Chlorobenzene	47		"	50.0		94.8	86-120		1.05	30	
Chloroform	41		"	50.0		82.8	76-131		1.84	30	
cis-1,2-Dichloroethylene	40		"	50.0		79.0	74-132		1.43	30	
Ethyl Benzene	46		"	50.0		91.4	84-125		2.10	30	
Methyl tert-butyl ether (MTBE)	43		"	50.0		85.2	74-131		1.82	30	
Methylene chloride	39		"	50.0		78.5	57-141		1.09	30	
Naphthalene	45		"	50.0		89.5	86-141		3.10	30	
n-Butylbenzene	46		"	50.0		92.9	80-130		4.28	30	
n-Propylbenzene	44		"	50.0		88.5	74-136		3.20	30	
o-Xylene	48		"	50.0		96.4	83-123		1.42	30	
p- & m- Xylenes	95		"	100		95.1	82-128		2.33	30	
sec-Butylbenzene	46		"	50.0		91.3	83-125		2.89	30	
tert-Butylbenzene	45		"	50.0		90.8	80-127		2.85	30	
Tetrachloroethylene	35		"	50.0		70.9	80-129	Low Bias	2.51	30	
Toluene	44		"	50.0		88.0	85-121		0.860	30	
trans-1,2-Dichloroethylene	39		"	50.0		77.2	72-132		0.491	30	
Trichloroethylene	43		"	50.0		85.3	84-123		0.887	30	
Vinyl Chloride	41		"	50.0		82.2	52-130		1.45	30	
Surrogate: SURR: 1,2-Dichloroethane-d4	50.3		"	50.0		101	77-125				
Surrogate: SURR: Toluene-d8	53.0		"	50.0		106	85-120				
Surrogate: SURR: p-Bromofluorobenzene	47.5		"	50.0		95.0	76-130				



Semivolatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20090 - EPA 3550C

Blank (BD20090-BLK1)

Prepared: 04/02/2022 Analyzed: 04/04/2022

2-Methylphenol	ND	41.6	ug/kg wet								
3- & 4-Methylphenols	ND	41.6	"								
Acenaphthene	ND	41.6	"								
Acenaphthylene	ND	41.6	"								
Anthracene	ND	41.6	"								
Benzo(a)anthracene	ND	41.6	"								
Benzo(a)pyrene	ND	41.6	"								
Benzo(b)fluoranthene	ND	41.6	"								
Benzo(g,h,i)perylene	ND	41.6	"								
Benzo(k)fluoranthene	ND	41.6	"								
Chrysene	ND	41.6	"								
Dibenzo(a,h)anthracene	ND	41.6	"								
Dibenzofuran	ND	41.6	"								
Fluoranthene	ND	41.6	"								
Fluorene	ND	41.6	"								
Hexachlorobenzene	ND	41.6	"								
Indeno(1,2,3-cd)pyrene	ND	41.6	"								
Naphthalene	ND	41.6	"								
Pentachlorophenol	ND	41.6	"								
Phenanthrene	ND	41.6	"								
Phenol	ND	41.6	"								
Pyrene	ND	41.6	"								
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Surrogate: SURR: 2-Fluorophenol	1240		"	1660		74.8	20-108				
Surrogate: SURR: Phenol-d5	1130		"	1660		68.3	23-114				
Surrogate: SURR: Nitrobenzene-d5	589		"	831		71.0	22-108				
Surrogate: SURR: 2-Fluorobiphenyl	583		"	831		70.2	21-113				
Surrogate: SURR: 2,4,6-Tribromophenol	1720		"	1660		104	19-110				
Surrogate: SURR: Terphenyl-d14	636		"	831		76.5	24-116				



Semivolatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20090 - EPA 3550C

LCS (BD20090-BS1)

Prepared: 04/02/2022 Analyzed: 04/04/2022

2-Methylphenol	600	41.6	ug/kg wet	831		72.2	10-146				
3- & 4-Methylphenols	507	41.6	"	831		61.1	20-109				
Acenaphthene	560	41.6	"	831		67.5	17-124				
Acenaphthylene	588	41.6	"	831		70.8	16-124				
Anthracene	607	41.6	"	831		73.0	24-124				
Benzo(a)anthracene	537	41.6	"	831		64.6	25-134				
Benzo(a)pyrene	614	41.6	"	831		73.9	29-144				
Benzo(b)fluoranthene	643	41.6	"	831		77.4	20-151				
Benzo(g,h,i)perylene	633	41.6	"	831		76.2	10-153				
Benzo(k)fluoranthene	634	41.6	"	831		76.3	10-148				
Chrysene	512	41.6	"	831		61.7	24-116				
Dibenzo(a,h)anthracene	668	41.6	"	831		80.4	17-147				
Dibenzofuran	547	41.6	"	831		65.8	23-123				
Fluoranthene	591	41.6	"	831		71.1	36-125				
Fluorene	574	41.6	"	831		69.1	16-130				
Hexachlorobenzene	550	41.6	"	831		66.2	10-129				
Indeno(1,2,3-cd)pyrene	785	41.6	"	831		94.6	10-155				
Naphthalene	560	41.6	"	831		67.4	20-121				
Pentachlorophenol	245	41.6	"	831		29.5	10-143				
Phenanthrene	556	41.6	"	831		66.9	24-123				
Phenol	639	41.6	"	831		76.9	15-123				
Pyrene	504	41.6	"	831		60.6	24-132				
Surrogate: SURR: 2-Fluorophenol	1240		"	1660		74.9	20-108				
Surrogate: SURR: Phenol-d5	1210		"	1660		72.6	23-114				
Surrogate: SURR: Nitrobenzene-d5	591		"	831		71.1	22-108				
Surrogate: SURR: 2-Fluorobiphenyl	560		"	831		67.5	21-113				
Surrogate: SURR: 2,4,6-Tribromophenol	1680		"	1660		101	19-110				
Surrogate: SURR: Terphenyl-d14	582		"	831		70.0	24-116				



Semivolatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20090 - EPA 3550C

Matrix Spike (BD20090-MS1)	*Source sample: 22C1732-01 (Matrix Spike)						Prepared: 04/02/2022 Analyzed: 04/04/2022				
2-Methylphenol	704	94.4	ug/kg dry	943	ND	74.6	10-160				
3- & 4-Methylphenols	629	94.4	"	943	ND	66.7	16-115				
Acenaphthene	681	94.4	"	943	ND	72.2	13-133				
Acenaphthylene	680	94.4	"	943	ND	72.1	25-125				
Anthracene	733	94.4	"	943	ND	77.8	27-128				
Benzo(a)anthracene	642	94.4	"	943	ND	68.1	20-147				
Benzo(a)pyrene	733	94.4	"	943	ND	77.8	18-153				
Benzo(b)fluoranthene	748	94.4	"	943	ND	79.3	10-163				
Benzo(g,h,i)perylene	779	94.4	"	943	ND	82.6	10-157				
Benzo(k)fluoranthene	736	94.4	"	943	ND	78.1	10-157				
Chrysene	597	94.4	"	943	ND	63.3	18-133				
Dibenzo(a,h)anthracene	817	94.4	"	943	ND	86.6	10-146				
Dibenzofuran	628	94.4	"	943	ND	66.6	26-134				
Fluoranthene	746	94.4	"	943	ND	79.0	10-155				
Fluorene	684	94.4	"	943	ND	72.5	12-150				
Hexachlorobenzene	654	94.4	"	943	ND	69.4	16-142				
Indeno(1,2,3-cd)pyrene	929	94.4	"	943	ND	98.5	10-155				
Naphthalene	668	94.4	"	943	ND	70.8	15-132				
Pentachlorophenol	259	94.4	"	943	ND	27.4	10-160				
Phenanthrene	677	94.4	"	943	ND	71.8	10-151				
Phenol	736	94.4	"	943	ND	78.0	11-124				
Pyrene	596	94.4	"	943	ND	63.2	13-148				
<i>Surrogate: SURR: 2-Fluorophenol</i>	<i>1490</i>		<i>"</i>	<i>1890</i>		<i>78.8</i>	<i>20-108</i>				
<i>Surrogate: SURR: Phenol-d5</i>	<i>1410</i>		<i>"</i>	<i>1890</i>		<i>74.6</i>	<i>23-114</i>				
<i>Surrogate: SURR: Nitrobenzene-d5</i>	<i>684</i>		<i>"</i>	<i>943</i>		<i>72.6</i>	<i>22-108</i>				
<i>Surrogate: SURR: 2-Fluorobiphenyl</i>	<i>650</i>		<i>"</i>	<i>943</i>		<i>69.0</i>	<i>21-113</i>				
<i>Surrogate: SURR: 2,4,6-Tribromophenol</i>	<i>1780</i>		<i>"</i>	<i>1890</i>		<i>94.2</i>	<i>19-110</i>				
<i>Surrogate: SURR: Terphenyl-d14</i>	<i>666</i>		<i>"</i>	<i>943</i>		<i>70.6</i>	<i>24-116</i>				



Semivolatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20090 - EPA 3550C

Matrix Spike Dup (BD20090-MSD1)	*Source sample: 22C1732-01 (Matrix Spike Dup)					Prepared: 04/02/2022 Analyzed: 04/04/2022					
2-Methylphenol	587	94.4	ug/kg dry	943	ND	62.2	10-160		18.1	30	
3- & 4-Methylphenols	544	94.4	"	943	ND	57.7	16-115		14.5	30	
Acenaphthene	662	94.4	"	943	ND	70.2	13-133		2.81	30	
Acenaphthylene	641	94.4	"	943	ND	68.0	25-125		5.83	30	
Anthracene	686	94.4	"	943	ND	72.7	27-128		6.70	30	
Benzo(a)anthracene	635	94.4	"	943	ND	67.3	20-147		1.18	30	
Benzo(a)pyrene	736	94.4	"	943	ND	78.0	18-153		0.308	30	
Benzo(b)fluoranthene	735	94.4	"	943	ND	77.9	10-163		1.73	30	
Benzo(g,h,i)perylene	758	94.4	"	943	ND	80.4	10-157		2.65	30	
Benzo(k)fluoranthene	724	94.4	"	943	ND	76.8	10-157		1.65	30	
Chrysene	604	94.4	"	943	ND	64.1	18-133		1.26	30	
Dibenzo(a,h)anthracene	789	94.4	"	943	ND	83.6	10-146		3.57	30	
Dibenzofuran	592	94.4	"	943	ND	62.8	26-134		5.81	30	
Fluoranthene	676	94.4	"	943	ND	71.7	10-155		9.77	30	
Fluorene	614	94.4	"	943	ND	65.1	12-150		10.7	30	
Hexachlorobenzene	684	94.4	"	943	ND	72.5	16-142		4.40	30	
Indeno(1,2,3-cd)pyrene	891	94.4	"	943	ND	94.5	10-155		4.15	30	
Naphthalene	595	94.4	"	943	ND	63.1	15-132		11.5	30	
Pentachlorophenol	211	94.4	"	943	ND	22.3	10-160		20.6	30	
Phenanthrene	646	94.4	"	943	ND	68.5	10-151		4.68	30	
Phenol	660	94.4	"	943	ND	70.0	11-124		10.8	30	
Pyrene	572	94.4	"	943	ND	60.6	13-148		4.13	30	
Surrogate: SURR: 2-Fluorophenol	1280		"	1890		67.7	20-108				
Surrogate: SURR: Phenol-d5	1280		"	1890		67.6	23-114				
Surrogate: SURR: Nitrobenzene-d5	676		"	943		71.7	22-108				
Surrogate: SURR: 2-Fluorobiphenyl	617		"	943		65.4	21-113				
Surrogate: SURR: 2,4,6-Tribromophenol	1820		"	1890		96.4	19-110				
Surrogate: SURR: Terphenyl-d14	672		"	943		71.3	24-116				



Semivolatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20142 - EPA 3510C

Blank (BD20142-BLK1)

Prepared: 04/04/2022 Analyzed: 04/05/2022

2-Methylphenol	ND	5.00	ug/L								
3- & 4-Methylphenols	ND	5.00	"								
Acenaphthene	ND	0.0500	"								
Acenaphthylene	ND	0.0500	"								
Anthracene	ND	0.0500	"								
Benzo(a)anthracene	ND	0.0500	"								
Benzo(a)pyrene	ND	0.0500	"								
Benzo(b)fluoranthene	ND	0.0500	"								
Benzo(g,h,i)perylene	ND	0.0500	"								
Benzo(k)fluoranthene	ND	0.0500	"								
Chrysene	ND	0.0500	"								
Dibenzo(a,h)anthracene	ND	0.0500	"								
Dibenzofuran	ND	5.00	"								
Fluoranthene	ND	0.0500	"								
Fluorene	ND	0.0500	"								
Hexachlorobenzene	ND	0.0200	"								
Indeno(1,2,3-cd)pyrene	ND	0.0500	"								
Naphthalene	ND	0.0500	"								
Pentachlorophenol	ND	0.250	"								
Phenanthrene	ND	0.0500	"								
Phenol	ND	5.00	"								
Pyrene	ND	0.0500	"								
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Surrogate: SURR: 2-Fluorophenol	23.0		"	50.0		46.1	19.7-63.1				
Surrogate: SURR: Phenol-d5	11.5		"	50.0		23.0	10.1-41.7				
Surrogate: SURR: Nitrobenzene-d5	20.2		"	25.0		80.7	50.2-113				
Surrogate: SURR: 2-Fluorobiphenyl	22.9		"	25.0		91.7	39.9-105				
Surrogate: SURR: 2,4,6-Tribromophenol	50.2		"	50.0		100	39.3-151				
Surrogate: SURR: Terphenyl-d14	24.0		"	25.0		96.0	30.7-106				



Semivolatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20142 - EPA 3510C

Blank (BD20142-BLK2)

Prepared: 04/04/2022 Analyzed: 04/06/2022

2-Methylphenol	ND	5.00	ug/L								
3- & 4-Methylphenols	ND	5.00	"								
Acenaphthene	ND	0.0500	"								
Acenaphthylene	ND	0.0500	"								
Anthracene	ND	0.0500	"								
Benzo(a)anthracene	ND	0.0500	"								
Benzo(a)pyrene	ND	0.0500	"								
Benzo(b)fluoranthene	ND	0.0500	"								
Benzo(g,h,i)perylene	ND	0.0500	"								
Benzo(k)fluoranthene	ND	0.0500	"								
Chrysene	ND	0.0500	"								
Dibenzo(a,h)anthracene	ND	0.0500	"								
Dibenzofuran	ND	5.00	"								
Fluoranthene	ND	0.0500	"								
Fluorene	ND	0.0500	"								
Hexachlorobenzene	ND	0.0200	"								
Indeno(1,2,3-cd)pyrene	ND	0.0500	"								
Naphthalene	ND	0.0500	"								
Pentachlorophenol	ND	0.250	"								
Phenanthrene	ND	0.0500	"								
Phenol	ND	5.00	"								
Pyrene	ND	0.0500	"								
Surrogate: SURR: 2-Fluorophenol	0.00		"	50.0			19.7-63.1				
Surrogate: SURR: Phenol-d5	0.00		"	50.0			10.1-41.7				
Surrogate: SURR: Nitrobenzene-d5	0.00		"	25.0			50.2-113				
Surrogate: SURR: 2-Fluorobiphenyl	0.00		"	25.0			39.9-105				
Surrogate: SURR: 2,4,6-Tribromophenol	0.00		"	50.0			39.3-151				
Surrogate: SURR: Terphenyl-d14	0.00		"	25.0			30.7-106				



Semivolatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20142 - EPA 3510C

LCS (BD20142-BS1)

Prepared: 04/04/2022 Analyzed: 04/05/2022

2-Methylphenol	10.9	5.00	ug/L	25.0		43.6	10-90				
3- & 4-Methylphenols	8.47	5.00	"	25.0		33.9	10-101				
Acenaphthene	15.0	0.0500	"	25.0		60.2	24-114				
Acenaphthylene	13.9	0.0500	"	25.0		55.4	26-112				
Anthracene	15.7	0.0500	"	25.0		62.7	35-114				
Benzo(a)anthracene	14.6	0.0500	"	25.0		58.4	38-127				
Benzo(a)pyrene	13.9	0.0500	"	25.0		55.6	30-146				
Benzo(b)fluoranthene	15.0	0.0500	"	25.0		60.2	36-145				
Benzo(g,h,i)perylene	16.8	0.0500	"	25.0		67.2	10-163				
Benzo(k)fluoranthene	15.4	0.0500	"	25.0		61.4	16-149				
Chrysene	15.0	0.0500	"	25.0		60.0	33-120				
Dibenzo(a,h)anthracene	17.2	0.0500	"	25.0		68.8	10-149				
Dibenzofuran	14.4	5.00	"	25.0		57.5	42-105				
Fluoranthene	14.9	0.0500	"	25.0		59.5	33-126				
Fluorene	15.0	0.0500	"	25.0		59.8	28-117				
Hexachlorobenzene	13.2	0.0200	"	25.0		52.7	27-120				
Indeno(1,2,3-cd)pyrene	14.7	0.0500	"	25.0		58.8	10-150				
Naphthalene	14.3	0.0500	"	25.0		57.4	30-99				
Pentachlorophenol	16.6	0.250	"	25.0		66.5	19-127				
Phenanthrene	14.6	0.0500	"	25.0		58.2	31-112				
Phenol	5.10	5.00	"	25.0		20.4	10-37				
Pyrene	15.2	0.0500	"	25.0		61.0	42-125				
Surrogate: SURR: 2-Fluorophenol	23.6		"	50.0		47.3	19.7-63.1				
Surrogate: SURR: Phenol-d5	13.3		"	50.0		26.5	10.1-41.7				
Surrogate: SURR: Nitrobenzene-d5	21.7		"	25.0		86.8	50.2-113				
Surrogate: SURR: 2-Fluorobiphenyl	23.8		"	25.0		95.2	39.9-105				
Surrogate: SURR: 2,4,6-Tribromophenol	57.4		"	50.0		115	39.3-151				
Surrogate: SURR: Terphenyl-d14	25.3		"	25.0		101	30.7-106				



Semivolatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20142 - EPA 3510C

LCS (BD20142-BS2)

Prepared: 04/04/2022 Analyzed: 04/05/2022

2-Methylphenol	ND	5.00	ug/L	1.00			10-90	Low Bias			
3- & 4-Methylphenols	ND	5.00	"	1.00			10-101	Low Bias			
Acenaphthene	0.660	0.0500	"	1.00		66.0	24-114				
Acenaphthylene	0.710	0.0500	"	1.00		71.0	26-112				
Anthracene	0.720	0.0500	"	1.00		72.0	35-114				
Benzo(a)anthracene	0.630	0.0500	"	1.00		63.0	38-127				
Benzo(a)pyrene	0.390	0.0500	"	1.00		39.0	30-146				
Benzo(b)fluoranthene	0.840	0.0500	"	1.00		84.0	36-145				
Benzo(g,h,i)perylene	0.840	0.0500	"	1.00		84.0	10-163				
Benzo(k)fluoranthene	0.850	0.0500	"	1.00		85.0	16-149				
Chrysene	0.840	0.0500	"	1.00		84.0	33-120				
Dibenzo(a,h)anthracene	0.800	0.0500	"	1.00		80.0	10-149				
Dibenzofuran	ND	5.00	"	1.00			42-105	Low Bias			
Fluoranthene	0.770	0.0500	"	1.00		77.0	33-126				
Fluorene	0.770	0.0500	"	1.00		77.0	28-117				
Hexachlorobenzene	0.690	0.0200	"	1.00		69.0	27-120				
Indeno(1,2,3-cd)pyrene	0.730	0.0500	"	1.00		73.0	10-150				
Naphthalene	0.760	0.0500	"	1.00		76.0	30-99				
Pentachlorophenol	0.350	0.250	"	1.00		35.0	19-127				
Phenanthrene	0.710	0.0500	"	1.00		71.0	31-112				
Phenol	ND	5.00	"	1.00			10-37	Low Bias			
Pyrene	0.870	0.0500	"	1.00		87.0	42-125				
Surrogate: SURR: 2-Fluorophenol	0.00		"	50.0			19.7-63.1				
Surrogate: SURR: Phenol-d5	0.00		"	50.0			10.1-41.7				
Surrogate: SURR: Nitrobenzene-d5	0.00		"	25.0			50.2-113				
Surrogate: SURR: 2-Fluorobiphenyl	0.00		"	25.0			39.9-105				
Surrogate: SURR: 2,4,6-Tribromophenol	0.00		"	50.0			39.3-151				
Surrogate: SURR: Terphenyl-d14	0.00		"	25.0			30.7-106				



Polychlorinated Biphenyls by GC/ECD - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BD20005 - EPA 3550C											
Blank (BD20005-BLK2)						Prepared & Analyzed: 04/01/2022					
Aroclor 1016	ND	0.0166	mg/kg wet								
Aroclor 1221	ND	0.0166	"								
Aroclor 1232	ND	0.0166	"								
Aroclor 1242	ND	0.0166	"								
Aroclor 1248	ND	0.0166	"								
Aroclor 1254	ND	0.0166	"								
Aroclor 1260	ND	0.0166	"								
Total PCBs	ND	0.0166	"								
Surrogate: Tetrachloro-m-xylene	0.0522		"	0.0664		78.5	30-140				
Surrogate: Decachlorobiphenyl	0.0475		"	0.0664		71.5	30-140				
LCS (BD20005-BS2)						Prepared & Analyzed: 04/01/2022					
Aroclor 1016	0.239	0.0166	mg/kg wet	0.332		72.1	40-130				
Aroclor 1260	0.225	0.0166	"	0.332		67.6	40-130				
Surrogate: Tetrachloro-m-xylene	0.0468		"	0.0664		70.5	30-140				
Surrogate: Decachlorobiphenyl	0.0352		"	0.0664		53.0	30-140				
Matrix Spike (BD20005-MS2)						*Source sample: 22C1735-01 (Matrix Spike) Prepared: 04/01/2022 Analyzed: 04/02/2022					
Aroclor 1016	0.275	0.0174	mg/kg dry	0.349	ND	78.9	40-140				
Aroclor 1260	0.290	0.0174	"	0.349	ND	83.3	40-140				
Surrogate: Tetrachloro-m-xylene	0.0520		"	0.0697		74.5	30-140				
Surrogate: Decachlorobiphenyl	0.0464		"	0.0697		66.5	30-140				
Matrix Spike Dup (BD20005-MSD2)						*Source sample: 22C1735-01 (Matrix Spike Dup) Prepared: 04/01/2022 Analyzed: 04/02/2022					
Aroclor 1016	0.294	0.0174	mg/kg dry	0.349	ND	84.3	40-140		6.62	50	
Aroclor 1260	0.327	0.0174	"	0.349	ND	93.8	40-140		11.9	50	
Surrogate: Tetrachloro-m-xylene	0.0534		"	0.0697		76.5	30-140				
Surrogate: Decachlorobiphenyl	0.0544		"	0.0697		78.0	30-140				



Polychlorinated Biphenyls by GC/ECD - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20216 - EPA SW846-3510C Low Level

Blank (BD20216-BLK2)

Prepared: 04/05/2022 Analyzed: 04/06/2022

Aroclor 1016	ND	0.0500	ug/L								
Aroclor 1221	ND	0.0500	"								
Aroclor 1232	ND	0.0500	"								
Aroclor 1242	ND	0.0500	"								
Aroclor 1248	ND	0.0500	"								
Aroclor 1254	ND	0.0500	"								
Aroclor 1260	ND	0.0500	"								
Total PCBs	ND	0.0500	"								
Surrogate: Tetrachloro-m-xylene	0.126		"	0.200		63.0	30-120				
Surrogate: Decachlorobiphenyl	0.125		"	0.200		62.5	30-120				

LCS (BD20216-BS2)

Prepared: 04/05/2022 Analyzed: 04/06/2022

Aroclor 1016	1.10	0.0500	ug/L	1.00		110	40-120				
Aroclor 1260	1.11	0.0500	"	1.00		111	40-120				
Surrogate: Tetrachloro-m-xylene	0.191		"	0.200		95.5	30-120				
Surrogate: Decachlorobiphenyl	0.189		"	0.200		94.5	30-120				

LCS Dup (BD20216-BSD2)

Prepared: 04/05/2022 Analyzed: 04/06/2022

Aroclor 1016	1.11	0.0500	ug/L	1.00		111	40-120	0.763	30		
Aroclor 1260	1.11	0.0500	"	1.00		111	40-120	0.216	30		
Surrogate: Tetrachloro-m-xylene	0.188		"	0.200		94.0	30-120				
Surrogate: Decachlorobiphenyl	0.182		"	0.200		91.0	30-120				

Batch Y2D0135 - BC23175

Aroclor Reference (Y2D0135-ARC1)

Prepared & Analyzed: 03/31/2022

Surrogate: Tetrachloro-m-xylene	0.209		ug/mL	0.200		104					
Surrogate: Decachlorobiphenyl	0.193		"	0.200		96.5					



Polychlorinated Biphenyls by GC/ECD - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch Y2D0301 - BC23175

Aroclor Reference (Y2D0301-ARC1)

Prepared & Analyzed: 04/01/2022

Surrogate: Tetrachloro-m-xylene	0.199		ug/mL	0.200		99.5					
Surrogate: Decachlorobiphenyl	0.198		"	0.200		99.0					

Batch Y2D0638 - BD20264

Aroclor Reference (Y2D0638-ARC1)

Prepared & Analyzed: 04/06/2022

Surrogate: Tetrachloro-m-xylene	0.203		ug/mL	0.200		102					
Surrogate: Decachlorobiphenyl	0.216		"	0.200		108					



Metals by ICP - Quality Control Data
York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BC23348 - EPA 3050B

Blank (BC23348-BLK1)

Prepared: 03/31/2022 Analyzed: 04/01/2022

Arsenic	ND	1.50	mg/kg wet
Barium	ND	2.50	"
Cadmium	ND	0.300	"
Chromium	ND	0.500	"
Lead	ND	0.500	"
Selenium	ND	2.50	"
Silver	ND	0.500	"

Duplicate (BC23348-DUP1)

*Source sample: 22C1737-08 (Duplicate)

Prepared: 03/31/2022 Analyzed: 04/01/2022

Arsenic	2.06	1.74	mg/kg dry	2.58	22.2	35
Barium	94.4	2.91	"	95.7	1.32	35
Cadmium	0.456	0.349	"	0.368	21.3	35
Chromium	32.7	0.581	"	31.7	3.28	35
Lead	19.4	0.581	"	20.5	5.47	35
Selenium	ND	2.91	"	ND		35
Silver	0.841	0.581	"	1.25	38.8	35 Non-dir.

Matrix Spike (BC23348-MS1)

*Source sample: 22C1737-08 (Matrix Spike)

Prepared: 03/31/2022 Analyzed: 04/01/2022

Arsenic	226	1.74	mg/kg dry	232	2.58	96.1	75-125
Barium	334	2.91	"	232	95.7	103	75-125
Cadmium	6.10	0.349	"	5.81	0.368	98.7	75-125
Chromium	51.6	0.581	"	23.2	31.7	85.8	75-125
Lead	84.5	0.581	"	58.1	20.5	110	75-125
Selenium	163	2.91	"	232	ND	70.1	75-125 Low Bias
Silver	6.78	0.581	"	5.81	1.25	95.2	75-125

Post Spike (BC23348-PS1)

*Source sample: 22C1737-08 (Post Spike)

Prepared: 03/31/2022 Analyzed: 04/01/2022

Arsenic	2.20	mg/L	2.00	0.022	109	75-125
Barium	3.24	"	2.00	0.823	121	75-125
Cadmium	0.059	"	0.0500	0.003	112	75-125
Chromium	0.498	"	0.200	0.272	113	75-125
Lead	0.760	"	0.500	0.176	117	75-125
Selenium	1.61	"	2.00	-0.236	80.6	75-125
Silver	0.028	"	0.0500	0.011	33.7	75-125 Low Bias



Metals by ICP - Quality Control Data
York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BC23348 - EPA 3050B

Reference (BC23348-SRM1)

Prepared: 03/31/2022 Analyzed: 04/01/2022

Arsenic	113	1.50	mg/kg wet	109		104	63.7-118.3				
Barium	422	2.50	"	364		116	70.3-117				
Cadmium	52.7	0.300	"	48.7		108	67.8-112.9				
Chromium	196	0.500	"	173		113	65.3-120.8				
Lead	110	0.500	"	101		109	69.1-126.7				
Selenium	73.1	2.50	"	104		70.3	58.5-122.1				
Silver	31.2	0.500	"	29.9		104	63.5-123.7				

Batch BD20190 - EPA 3050B

Blank (BD20190-BLK1)

Prepared: 04/04/2022 Analyzed: 04/05/2022

Arsenic	ND	1.50	mg/kg wet								
Barium	ND	2.50	"								
Cadmium	ND	0.300	"								
Chromium	ND	0.500	"								
Lead	ND	0.500	"								
Selenium	ND	2.50	"								
Silver	ND	0.500	"								

Duplicate (BD20190-DUP1)

*Source sample: 22D0058-11 (Duplicate)

Prepared: 04/04/2022 Analyzed: 04/05/2022

Arsenic	4.86	1.62	mg/kg dry		6.24				24.9	35	
Barium	34.8	2.70	"		29.1				17.8	35	
Cadmium	0.540	0.324	"		0.526				2.59	35	
Chromium	15.2	0.540	"		16.6				8.83	35	
Lead	15.0	0.540	"		7.18				70.4	35	Non-dir.
Selenium	5.73	2.70	"		6.48				12.2	35	
Silver	1.39	0.540	"		1.12				21.5	35	



Metals by ICP - Quality Control Data
York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20190 - EPA 3050B

Matrix Spike (BD20190-MS1)		*Source sample: 22D0058-11 (Matrix Spike)						Prepared: 04/04/2022 Analyzed: 04/05/2022			
Arsenic	205	1.62	mg/kg dry	216	6.24	92.0	75-125				
Barium	238	2.70	"	216	29.1	96.8	75-125				
Cadmium	5.09	0.324	"	5.40	0.526	84.6	75-125				
Chromium	35.1	0.540	"	21.6	16.6	86.0	75-125				
Lead	52.8	0.540	"	54.0	7.18	84.5	75-125				
Selenium	179	2.70	"	216	6.48	80.0	75-125				
Silver	6.69	0.540	"	5.40	1.12	103	75-125				

Post Spike (BD20190-PS1)		*Source sample: 22D0058-11 (Post Spike)						Prepared: 04/04/2022 Analyzed: 04/05/2022			
Arsenic	1.99		mg/L	2.00	0.058	96.7	75-125				
Barium	2.30		"	2.00	0.269	102	75-125				
Cadmium	0.050		"	0.0500	0.005	89.6	75-125				
Chromium	0.348		"	0.200	0.153	97.4	75-125				
Lead	0.552		"	0.500	0.066	97.0	75-125				
Selenium	1.69		"	2.00	0.060	81.4	75-125				
Silver	0.055		"	0.0500	0.010	88.8	75-125				

Reference (BD20190-SRM1)								Prepared: 04/04/2022 Analyzed: 04/05/2022			
Arsenic	84.1	1.50	mg/kg wet	109		77.1	63.7-118.3				
Barium	341	2.50	"	364		93.6	70.3-117				
Cadmium	42.0	0.300	"	48.7		86.3	67.8-112.9				
Chromium	161	0.500	"	173		93.2	65.3-120.8				
Lead	80.7	0.500	"	101		79.9	69.1-126.7				
Selenium	58.1	2.50	"	104		55.9	58.5-122.1	Low Bias			
Silver	22.9	0.500	"	29.9		76.6	63.5-123.7				



Metals by ICP/MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20012 - EPA 3015A

Blank (BD20012-BLK1)

Prepared & Analyzed: 04/01/2022

Arsenic	ND	1.11	ug/L
Barium	ND	1.11	"
Cadmium	ND	0.556	"
Chromium	ND	1.11	"
Lead	ND	1.11	"
Selenium	ND	1.11	"
Silver	ND	1.11	"

LCS (BD20012-BS1)

Prepared & Analyzed: 04/01/2022

Arsenic	49.9		ug/L	50.0	99.8	80-120	
Barium	51.0		"	50.0	102	80-120	
Cadmium	62.3		"	50.0	125	80-120	High Bias
Chromium	52.9		"	50.0	106	80-120	
Lead	42.0		"	50.0	84.1	80-120	
Selenium	49.9		"	50.0	99.7	80-120	
Silver	175		"	50.0	351	80-120	High Bias

Duplicate (BD20012-DUP1)

*Source sample: 22C1730-05 (B3)

Prepared & Analyzed: 04/01/2022

Arsenic	ND	1.11	ug/L	1.17			20
Barium	21.7	1.11	"	ND			20
Cadmium	ND	0.556	"	ND			20
Chromium	ND	1.11	"	2.13			20
Lead	1.99	1.11	"	ND			20
Selenium	ND	1.11	"	ND			20
Silver	ND	1.11	"	ND			20

Matrix Spike (BD20012-MS1)

*Source sample: 22C1730-05 (B3)

Prepared & Analyzed: 04/01/2022

Arsenic	58.7		ug/L	50.0	1.06	115	75-125	
Barium	192		"	50.0	0.756	383	75-125	High Bias
Cadmium	61.6		"	50.0	0.002	123	75-125	
Chromium	58.8		"	50.0	1.92	114	75-125	
Lead	48.1		"	50.0	0.081	96.0	75-125	
Selenium	56.7		"	50.0	-0.327	113	75-125	
Silver	165		"	50.0	-0.559	330	75-125	High Bias



Metals by ICP/MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20337 - EPA 3015A

Blank (BD20337-BLK1)

Prepared & Analyzed: 04/06/2022

Arsenic - Dissolved	ND	1.11	ug/L
Barium - Dissolved	ND	1.11	"
Cadmium - Dissolved	ND	0.556	"
Chromium - Dissolved	1.83	1.11	"
Lead - Dissolved	ND	1.11	"
Selenium - Dissolved	ND	1.11	"
Silver - Dissolved	ND	1.11	"

LCS (BD20337-BS1)

Prepared & Analyzed: 04/06/2022

Arsenic - Dissolved	0.049		ug/mL	0.0500	98.9	80-120
Barium - Dissolved	0.056		"	0.0500	111	80-120
Cadmium - Dissolved	0.060		"	0.0500	121	80-120 High Bias
Chromium - Dissolved	0.052		"	0.0500	103	80-120
Lead - Dissolved	0.042		"	0.0500	84.4	80-120
Selenium - Dissolved	0.051		"	0.0500	102	80-120
Silver - Dissolved	0.150		"	0.0500	300	80-120 High Bias

Duplicate (BD20337-DUP1)

*Source sample: 22D0064-04 (Duplicate)

Prepared & Analyzed: 04/06/2022

Arsenic - Dissolved	150	1.11	ug/L	4.92		187	20	Non-dir.
Barium - Dissolved	ND	1.11	"	147			20	
Cadmium - Dissolved	ND	0.556	"	ND			20	
Chromium - Dissolved	9.88	1.11	"	3.09		105	20	Non-dir.
Lead - Dissolved	ND	1.11	"	ND			20	
Selenium - Dissolved	3490	1.11	"	ND			20	
Silver - Dissolved	ND	1.11	"	ND			20	

Matrix Spike (BD20337-MS1)

*Source sample: 22D0064-04 (Matrix Spike)

Prepared: 04/06/2022 Analyzed: 04/07/2022

Arsenic - Dissolved	-0.0001		ug/mL	0.0500	0.004	NR	75-125	Low Bias
Barium - Dissolved	-0.00001		"	0.0500	0.133	NR	75-125	Low Bias
Cadmium - Dissolved	-0.00001		"	0.0500	0.00002	NR	75-125	Low Bias
Chromium - Dissolved	0.0002		"	0.0500	0.003	NR	75-125	Low Bias
Lead - Dissolved	0.00002		"	0.0500	0.0002	NR	75-125	Low Bias
Selenium - Dissolved	-0.0007		"	0.0500	-0.0004		75-125	Low Bias
Silver - Dissolved	-0.0002		"	0.0500	-0.00006		75-125	Low Bias



Mercury by EPA 7000/200 Series Methods - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC23351 - EPA SW846-7470A											
Blank (BC23351-BLK1)						Prepared & Analyzed: 03/31/2022					
Mercury - Dissolved	ND	0.0002	mg/L								
LCS (BC23351-BS1)						Prepared & Analyzed: 03/31/2022					
Mercury - Dissolved	0.0022	0.0002	mg/L	0.00200		111	80-120				
LCS (BC23351-BS2)						Prepared & Analyzed: 03/31/2022					
Mercury - Dissolved	0.0020	0.0002	mg/L	0.00200		98.6	80-120				
Batch BD20080 - EPA SW846-7470A											
Blank (BD20080-BLK1)						Prepared & Analyzed: 04/01/2022					
Mercury	ND	0.0002	mg/L								
LCS (BD20080-BS1)						Prepared & Analyzed: 04/01/2022					
Mercury	0.0019137	0.0002	mg/L	0.00200		95.7	80-120				
LCS (BD20080-BS2)						Prepared & Analyzed: 04/01/2022					
Mercury	0.0020659	0.0002	mg/L	0.00200		103	80-120				
Batch BD20343 - EPA 7473 soil											
Blank (BD20343-BLK1)						Prepared & Analyzed: 04/06/2022					
Mercury	ND	0.0300	mg/kg wet								
Duplicate (BD20343-DUP1)						Prepared & Analyzed: 04/06/2022					
Mercury	ND	0.0324	mg/kg dry		ND					35	



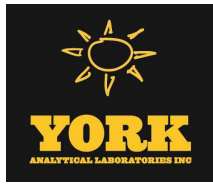
Mercury by EPA 7000/200 Series Methods - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20343 - EPA 7473 soil

Matrix Spike (BD20343-MS1)		*Source sample: 22D0058-11 (Matrix Spike)						Prepared & Analyzed: 04/06/2022			
Mercury	0.530		mg/kg	0.500	0.0132	103	75-125				
Reference (BD20343-SRM1)								Prepared & Analyzed: 04/06/2022			
Mercury	29.530		mg/kg	27.2		109	59.9-140.1				



Miscellaneous Physical Parameters - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
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Batch BD20281 - % Solids Prep

Duplicate (BD20281-DUP1)		*Source sample: 22D0129-02 (Duplicate)						Prepared: 04/05/2022 Analyzed: 04/06/2022			
% Solids	77.1	0.100	%		77.9				1.11	20	



Volatile Analysis Sample Containers

Lab ID	Client Sample ID	Volatile Sample Container
22C1730-01	B-3 (1-2 ft)	2 oz. WM Clear Glass Cool to 4° C
22C1730-02	B-3 (8-9 ft)	2 oz. WM Clear Glass Cool to 4° C
22C1730-03	B-5 (1-2 ft)	2 oz. WM Clear Glass Cool to 4° C
22C1730-04	B-5 (3-4 ft)	40mL Vial with Stir Bar-Cool 4° C
22C1730-05	B3	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C
22C1730-06	Trip Blank	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C



Sample and Data Qualifiers Relating to This Work Order

S-08	The recovery of this surrogate was outside of QC limits.
QL-02	This LCS analyte is outside Laboratory Recovery limits due the analyte behavior using the referenced method. The reference method has certain limitations with respect to analytes of this nature.
M-SRD1	The serial dilution for this element was outside control limits.
M-SPKM	The spike recovery is not within acceptance windows due to sample non-homogeneity, or matrix interference.
M-ICV2	The recovery for this element in the ICV was outside the 90-110% recovery criteria.
M-DUPS	The RPD between the native sample and the duplicate is outside of limits due to sample non-homogeneity
M-CRL	The RL check for this element recovered outside of control limits.
M-BS	The recovery for this element in the batch blank spike recovered slightly outside of control limits
M-BLK	The target analyte was detected above the RL in the batch method blank. All samples showed >10x the concentration in the blank for this analyte. Data are reported.
J	Detected below the Reporting Limit but greater than or equal to the Method Detection Limit (MDL/LOD) or in the case of a TIC, the result is an estimated concentration.
ICV-E	The value reported is ESTIMATED. The value is estimated due to its behavior during initial calibration verification (recovery exceeded 30% of expected value).
EXT-D	The sample submitted contained sediment. The aqueous portion was decanted off, the volume measured and used for the extraction. The sediment was not included in the extraction.
CCV-E	The value reported is ESTIMATED. The value is estimated due to its behavior during continuing calibration verification (>20% Difference for average Rf or >20% Drift for quadratic fit).
B	Analyte is found in the associated analysis batch blank. For volatiles, methylene chloride and acetone are common lab contaminants.

Definitions and Other Explanations

*	Analyte is not certified or the state of the samples origination does not offer certification for the Analyte.
ND	NOT DETECTED - the analyte is not detected at the Reported to level (LOQ/RL or LOD/MDL)
RL	REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.
LOQ	LIMIT OF QUANTITATION - the minimum concentration of a target analyte that can be reported within a specified degree of confidence. This is the lowest point in an analyte calibration curve that has been subjected to all steps of the processing/analysis and verified to meet defined criteria. This is based upon NELAC 2009 Standards and applies to all analyses.
LOD	LIMIT OF DETECTION - a verified estimate of the minimum concentration of a substance in a given matrix that an analytical process can reliably detect. This is based upon NELAC 2009 Standards and applies to all analyses conducted under the auspices of EPA SW-846.
MDL	METHOD DETECTION LIMIT - a statistically derived estimate of the minimum amount of a substance an analytical system can reliably detect with a 99% confidence that the concentration of the substance is greater than zero. This is based upon 40 CFR Part 136 Appendix B and applies only to EPA 600 and 200 series methods.
Reported to	This indicates that the data for a particular analysis is reported to either the LOD/MDL, or the LOQ/RL. In cases where the "Reported to" is located above the LOD/MDL, any value between this and the LOQ represents an estimated value which is "J" flagged accordingly. This applies to volatile and semi-volatile target compounds only.
NR	Not reported
RPD	Relative Percent Difference
Wet	The data has been reported on an as-received (wet weight) basis



- Low Bias** Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
- High Bias** High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
- Non-Dir.** Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.

If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two. For this reason, York reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.

If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.

2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.

Semi-Volatile and Volatile analyses are reported down to the LOD/MDL, with values between the LOD/MDL and the LOQ being "J" flagged as estimated results.

For analyses by EPA SW-846-8270D, the Limit of Quantitation (LOQ) reported for benzidine is based upon the lowest standard used for calibration and is not a verified LOQ due to this compound's propensity for oxidative losses during extraction/concentration procedures and non-reproducible chromatographic performance.



APPENDIX B

NYSDEC Spill Closure



Spill Incidents Database Search Details

Spill Record

Administrative Information

DEC Region: 3

Spill Number: 2200295

Spill Date/Time

Spill Date: 04/11/2022 **Spill Time:** 03:50:00 PM

Call Received Date: 04/11/2022 **Call Received Time:** 03:50:00 PM

Location

Spill Name: COMMERCIAL PROPERTY- MTA LOT

Address: RAILROAD DR

City: BEACON **County:** Dutchess

Spill Description

Material Spilled Amount Spilled Resource Affected

other UNKNOWN Groundwater

Cause: Unknown

Source: Commercial/Industrial

Waterbody:

Record Close

Date Spill Closed: 04/29/2022

"Date Spill Closed" means the date the spill case was closed by the case manager in the Department of Environmental Conservation (the Department). The spill case was closed because either; a) the records and data submitted indicate that the necessary cleanup and removal actions have been completed and no further remedial activities are necessary, or b) the case was closed for administrative reasons (e.g., multiple reports of a single spill consolidated into a single spill number). The Department however reserves the right to require additional remedial work in relation to the spill, if in the future it determines that further action is necessary.

If you have questions about this reported incident, please contact the [Regional Office](#) where the incident occurred.

Refine This Search



APPENDIX C

Email from Waste Management of NY

St.Romain, Arlette

From: Rossi, Sue <srossi@wm.com>
Sent: Wednesday, May 11, 2022 1:10 PM
To: St.Romain, Arlette
Cc: Conde III, Thomas
Subject: RE: [Ext] FW: [EXTERNAL] Soil disposal options (2220630)

Yes that should be fine. We would need the actual lab reports with the chain once you profile. The profiles can be done on line at www.wmsolutions.com

Sue Rossi, CHMM
Sr. Industrial Account Manager
WM of NY
srossi@wm.com

C: 585-259-9408
303 Brew Rd
Bergen, NY 14416



From: St.Romain, Arlette <astromain@LaBellaPC.com>
Sent: Wednesday, May 11, 2022 1:00 PM
To: Rossi, Sue <srossi@wm.com>
Subject: RE: [Ext] FW: [EXTERNAL] Soil disposal options (2220630)

Thanks Sue.

Since our total lead and mercury are less than TCLP limit x 20 (100 and 4 ppm, respectively) and less than 80% of those levels, it sounds like TCLP would not be needed. Is that right?

We sampled to assess if impacts migrated from off-site petroleum release, but we did not see evidence of petroleum impacts and no known lead or mercury contaminant sources were identified.

Thanks again,
Arlette

Sample ID (depth, ft. bgs)	Brownfield Cleanup Program Part 375-6 Soil Cleanup Objectives				3/
Sampling Date/Time	CP/SCO Table 2- Gasoline	CP/SCO Table 3-Fuel Oil	Unrestricted Use	Residential Use	
Compound					
Metals, RCRA					
Dilution Factor					
Arsenic	~	~	13	16	
Barium	~	~	350	350	
Cadmium	~	~	2.5	2.5	
Chromium	30	30	30	36	
Lead	~	~	63	400	
Mercury	~	~	0.18	0.81	
Selenium	~	~	3.9	36	
Silver	~	~	2	36	
Polychlorinated Biphenyls (PCB)					
Dilution Factor					
Aroclor 1016	~	~	~	~	
Aroclor 1221	~	~	~	~	
Aroclor 1232	~	~	~	~	
Aroclor 1242	~	~	~	~	
Aroclor 1248	~	~	~	~	
Aroclor 1254	~	~	~	~	
Aroclor 1260	~	~	~	~	
Total PCBs	~	~	0.1	1	
Total Solids					

Arlette St. Romain

LaBella Associates | Brownfields Program Manager



518-824-1928 direct
 518-260-1811 cell
 5 McCrea Hill Road
 Ballston Spa, NY 12020
labellapc.com

From: Rossi, Sue <srossi@wm.com>**Sent:** Wednesday, May 11, 2022 11:14 AM**To:** St.Romain, Arlette <astromain@LaBellaPC.com>**Subject:** RE: [Ext] FW: [EXTERNAL] Soil disposal options (2220630)

Yes we would need TCLP metals based on the results. Anything with 80% of the 20x rule. What is the soil contaminated with and I can let you know if we would need more testing.
If it passes. With less than 1 ppm pcb from no known source we can approve as cover at Green Ridge as long as the test results are good.

Sue Rossi, CHMM

Sr. Industrial Account Manager

WM of NY

srossi@wm.com

C: 585-259-9408
303 Brew Rd
Bergen, NY 14416



From: St.Romain, Arlette <astromain@LaBellaPC.com>
Sent: Wednesday, May 11, 2022 11:05 AM
To: Rossi, Sue <srossi@wm.com>
Subject: RE: [Ext] FW: [EXTERNAL] Soil disposal options (2220630)

Hi Sue,
Yes I am still interested in know if additional analysis would be needed based on these Total data, and if these data indicate that this material would be acceptable for use as alternate day cover or for disposal at the Green Ridge facility?
Thanks so much,
Arlette

Arlette St. Romain

LaBella Associates | Brownfields Program Manager



518-824-1928 direct
518-260-1811 cell
5 McCrea Hill Road
Ballston Spa, NY 12020
labellapc.com

From: Rossi, Sue <srossi@wm.com>
Sent: Wednesday, May 11, 2022 11:02 AM
To: St.Romain, Arlette <astromain@labellapc.com>
Subject: [Ext] FW: [EXTERNAL] Soil disposal options (2220630)

Arlette,

I am sorry I believe this may have been lost in my emails. Are you still looking for options at this point? If so are these total data?

From: "St.Romain, Arlette" <astromain@labellapc.com>
Date: May 4, 2022 at 5:51:00 PM EDT
To: "Rossi, Sue" <srossi@wm.com>
Subject: [EXTERNAL] Soil disposal options (2220630)

Hello Sue,

I am working on a construction project in Dutchess County where approximately 300 CY of soil will be generated. Based on the attached soil sampling results, two of four samples had lead between 65.4 and 79.4 ppm, and one of the four samples had mercury at 0.56 ppm. Understanding that a waste profile would be needed, but do these data indicate that this material would be acceptable for use as alternate day cover or for disposal at the Green Ridge facility? Would additional analyses be needed for this soil?

Thanks so much,
Arlette

Arlette St. Romain

LaBella Associates | Brownfields Program Manager

518-824-1928 direct

518-260-1811 cell

5 McCrea Hill Road

Ballston Spa, NY 12020

labellapc.com

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GEOTECHNICAL REPORT



Proactive by Design



GEOTECHNICAL INVESTIGATION

West Main Street Pump Station Upgrades

City of Beacon, Dutchess County, New York

The City of Beacon

April 14, 2022

File No. 26.0092615.00

PREPARED FOR:

Lanc & Tully Engineering and Surveying, P.C.
P. O. Box 687
Goshen, New York 10924

GZA GeoEnvironmental of New York

104 West 29th Street, 10th Floor | New York, NY 1
212-594-8140

32 Offices Nationwide
www.gza.com

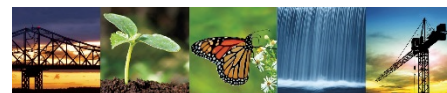
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Proactive by Design

GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION
MANAGEMENT

GZA GeoEnvironmental of NY
104 West 29th Street
10th Floor
New York, NY 10001
T: 212.594.8140
F: 212.279.8180
www.gza.com



April 14, 2022
File No. 26.0092615.00

Lanc & Tully Engineering and Surveying, P.C.
PO Box 687
Goshen, New York 10924

Attention: John Russo, P.E.
Principal

Report
Geotechnical Investigation
West Main Street Pump Station Upgrades
City of Beacon, Dutchess County, New York
The City of Beacon

Introduction

This report presents the results of the geotechnical investigation performed by GZA GeoEnvironmental of New York (GZA) for the proposed West Main Street Pump Station Upgrades that may be constructed on the MTA Metro-North's property near the intersection of Main Street and River Street in the City of Beacon, Dutchess County, New York. The project location is shown on the Site Location Map, Plate 1. This report was prepared in general accordance with the terms of our proposal dated December 17, 2021 and executed on January 18, 2022.

Background

Based on design drawings provided to us prepared by Tighe & Bond and dated January 2022, the proposed construction will consist of a 12 foot by 20.83-foot electrical building, a proposed generator, a valve vault, and a wet well with an associated sanitary sewer pipeline, surrounding concrete sidewalks, and driveways. The surrounding grades will reportedly be around Elevation (El.) +11 feet.



The proposed wet well will reportedly be approximately 16 feet in diameter and will be established with a rim El. +11.5 feet and bear at approximate El. -6.6 feet minus another approximate 12 inches for stone bedding. The valve vault will reportedly be an approximate 11 foot by 11 foot by 6.5-foot precast concrete valve vault established flush with the surrounding grade at El. +11 feet and will extend to approximate El. +4 feet minus the thickness of the stone bedding. The wet well will be equipped with three submersible pumps and three 8-inch diameter ductile iron discharge pipes which will connect and transition to one 12-inch diameter PVC pipe at the valve vault. The electrical building will consist of a prefabricated building with a finished floor elevation (FFE) of +11.42 feet with a bottom of footing elevation of +7 feet. The proposed generator pad will reportedly consist of a 10-inch reinforced slab in the center transitioning to a haunched/thickened turned down section along the perimeter of the pad that extends another 12 inches below the 10-inch concrete pad section. The thickened haunched section is 12 inch wide and slopes up to the center at a 1 to 1 slope. A new sanitary manhole (designated) as SMH-1 will be located to the southeast of the new wet well between the wet well and existing manhole-1 with a new 18-inch sanitary line constructed between the existing manhole and the wet well. The sanitary pipe will have an invert elevation of approximately El. +5.15 and +5.08 feet at SMH-1 and the wet well, respectively.

Purpose and Scope of Work

The purpose of our services was to:

- 1) explore the subsurface soil, rock and groundwater conditions within the proposed construction_areas at the approximate locations provided to us;
- 2) estimate the relevant geotechnical engineering properties of the encountered materials;
- 3) evaluate the site foundation requirements considering the anticipated construction and encountered subsurface conditions;



- 4) recommend an appropriate type of foundation for support of the proposed structures, and provide geotechnical-related foundation design and installation criteria, including an estimate of the Site Class as defined by the Building Code of the State of New York (NYSBC), for seismic design purposes;
- 5) provide recommendations for the support and the need for subdrainage of the lowest level floor slabs;
- 6) provide estimated lateral pressures for the design of below grade pump station walls;
- 7) estimate the post-construction settlements of the recommended floor and foundation systems; and
- 8) discuss appropriate earthwork operations or considerations consistent with the proposed construction and encountered subsurface conditions.

To accomplish these purposes, we performed the requested subsurface exploration program consisting of six test borings (B-1 through B-6) at the approximate locations shown on the plan provided to us and installed one groundwater monitoring well within the footprint of the proposed wet well location. The borings were advanced as follows: B-1 was performed to the east of the proposed wet well location between the proposed wet well and the existing one story brick building; B-2 was performed within the footprint of the wet well (where the groundwater monitoring well was installed); B-3 was performed to the south of the wet well location, B-4 was performed within the footprint of the valve vault; B-5 was performed within the footprint of the proposed generator pad; and B-6 was performed within the footprint of the proposed electrical building. The approximate locations of the borings are shown on the Plot Plan, Plate 2.

The borings were advanced utilizing mud rotary cased and wash drilling equipment mounted on an all-terrain vehicle and extended to depths ranging from approximately 6.4 to 20 feet below existing grades (bgs). The borings were terminated at shallower depths than those initially proposed due to early refusal on the surface of the existing bedrock.

Soil samples were extracted from the borings at closed spaced intervals in general accordance with the procedures of the Standard Penetration Test. Rock coring was performed at two locations, B-2 (10 feet rock core) and B-6 (5 feet rock core), using a NQ size double tube core barrel which extracts a sample approximately two inches in



diameter. Rock core recovery and rock quality designation (RQD) was measured and documented. The groundwater monitoring well consisting of a 2-inch PVC riser and screen with a 15-foot screen installed to a depth of 20 feet bgs. The groundwater monitoring well was gauged upon initial installation and again after approximately 24 hours of stabilization time (prior to our site demobilization).

All field work was performed under the direct technical observation of a GZA geotechnical engineer. Our representative located the explorations in the field relative to stakes provided by others, maintained continuous logs of the explorations as the work proceeded, and supervised the soil sampling and rock coring operations to develop the desired subsurface information.

All soil and rock samples were brought to our office where they were examined, and selected samples were subjected to geotechnical laboratory testing consisting of gradation/sieve analysis and moisture content testing.

Detailed descriptions of the encountered subsurface conditions are presented on the individual boring logs, Plates 3A through 3F. The soils have been visually classified in general accordance with the Unified Soil Classification System described on Plate 4. The gradation curves are shown on Plate 5. Moisture content test results are provided on the boring logs. The rock cores have been described in general accordance with the International Society of Rock Mechanics (ISRM) and the classification system shown on Plate 6.

The results of our field exploration and laboratory testing programs have provided the basis for our engineering analyses and geotechnical design recommendations. The following discussions of our findings and recommendations are subject to the limitations attached as Appendix I to this report.

Site Conditions

Surface Features: The site of the proposed pump station structures currently consists of a small vacant lot that was formerly wooded, but recently cleared (by others). The site is located to the east of an existing paved parking lot, to the north of West Main Street, and to the west of an existing one-story brick structure. The lot is generally



flat with some sporadic trees and light foliage throughout. The topography on the plans provided to us indicate existing grades ranging from approximate El. +9.5 to +11.5 feet.

Subsurface Conditions: The subsurface conditions encountered in the explorations performed for this study consisted of the following generalized strata, listed in order of increasing depth:

- 1) Surface Materials: Approximately 2 inches of topsoil was encountered at each boring location.
- 2) Existing Fill: Variable existing fill was present below the topsoil in all the borings. The fill generally consisted of gravelly silty sands or sandy silts with roots, bricks, cinders/coal fragments and occasional brick and ceramic debris. The existing fill generally extended to depths of approximately 4 to 6 feet bgs.
- 3) Clayey Silts and Silty Sands: Except at B-5 and B-6, the fill was underlain by medium stiff to stiff clayey silts or medium dense silty sands with varying percentages of gravel (and sands in the clayey silts). These materials were generally 1 to 3 feet thick and extended to depths of approximately 6 to 8 feet bgs.
- 4) Weathered Bedrock: The clayey silts and silty sands in B-1 through B-4, and the existing fill in B-5 and B-6 were underlain by weathered/decomposed bedrock with varying sand and silt content. Borings B-1 and B-3 through B-5 were terminated in the weathered bedrock due to sampler or drilling refusal at depths ranging from approximately 6.4 to 9.8 feet bgs. In B-2 and B-6, refusal was encountered, and coring of sound bedrock commenced at a depth of approximately 10 and 6 feet bgs, respectively. The depths of drilling refusal are provided on the Plot Plan.
- 5) Bedrock: The bedrock was cored at B-2 and B-6 from approximately 10 to 20 feet bgs and 6 to 11 feet bgs, respectively. At B-2, gray/black phyllite bedrock with quartz veins was recovered with a measured RQD of 62 (fair quality) and 82 (good quality) percent, respectively, for the 10 to 15 feet and the 15 to 20 feet core run. At B-6, gray/black calcareous meta-conglomerate bedrock was recovered with a measured RQD of 16 percent (very poor quality). Rock core photographs are provided in Appendix II.

Groundwater: Groundwater seepage was observed in three of the borings (B-2, B-3, and B-4) at depths generally ranging from approximately 6.5 to 7.5 feet bgs, corresponding to approximate El. +2.2 feet to +3 feet. A groundwater reading of 7.3 feet bgs (El. 2.2 feet) was obtained from the monitoring well installed at B-2 after 24 hours of stabilization. Groundwater is likely perched atop the bedrock surface. It should be noted that groundwater seepage conditions should be expected to vary depending on weather, utility breaks, proposed construction and other factors that may not have been present at the time our borings were completed.



Findings and Recommendations

General: Based on the results of our study, it is our opinion that:

- 1) The proposed pump station structures could be supported atop conventional shallow foundations, pads, or mats deriving their support from the natural soils, underlying weathered bedrock, or controlled compacted fill installed atop these materials to reach the proposed subgrade levels. The existing fill should be completely removed to its full depth below all structures and be replaced with controlled compacted fill as necessary. The existing fill will naturally be removed as part of the proposed excavations to facilitate the construction of the valve vault and the wet well structures. However, overexcavation of the existing fill will be required beneath the proposed generator pad and electrical building and replacement with controlled compacted fill. Foundations supported atop the suitable natural soils or controlled compacted fill could be designed for maximum net allowable bearing pressures of up to 2 tons per square foot (psf). Foundations supported directly atop bedrock can be designed for up to 6 tsf. All mats and slabs should be underlain by a minimum 12-inch-thick layer of porous fill (clean crushed stone) to provide a capillary break between the slab/pad and the subgrade soils, unless the design engineers require a thicker section. Manholes and utilities may bear on recompacted existing fill materials or natural soils.
- 2) Groundwater seepage was encountered in B-2 through B-4 at depths on the order of 6.5 to 7.5 feet bgs. The excavation for the wet well is expected to extend approximately 10 feet below the observed and measured groundwater levels. Therefore, temporary (during construction) and permanent groundwater control should be expected to be required especially for the valve vault and wet well design and construction. The contractor should be required to provide all dewatering as necessary to maintain relatively dry excavations and the work should be done in a careful manner to avoid settlement of adjacent structures and improvements. Control of surface runoff should also be provided to prevent inundation of subgrades and flooding of excavations. For design purposes, a design groundwater level of El. +4 feet should be considered for permanent design purposes, or the design flood elevation (DFE) as determined by the site engineer (if higher). Below grade structures should be designed to resist uplift forces due to hydrostatic forces.
- 3) Approximately 17 feet of excavation, with up to 9 to 10 feet of bedrock excavation, is expected to construct the wet well and underlying bedding. Contractor should be equipped with proper bedrock excavation equipment and the work should be performed in a manner that will not have detrimental effects on nearby structures or improvements. Temporary support of excavation will be critical for the deep cuts to install the wet well and valve vault.
- 4) Siltier portions of the excavated fill and the natural silty/clayey soils would generally be poorly suited for reuse as fill or backfill as they would be highly susceptible to moisture related stability and compaction issues and would provide potential construction delays for drying and re-compaction work. These materials would be better suited for use in non-structural landscaped areas. More granular portions of the existing fill, natural gravelly silty sands, or well fragmented rock broken or crushed into primarily sand and gravel size fragments, would provide a fair to good source of materials for reuse as controlled compacted fill provided, they are deemed acceptable environmentally (by others) and are conditioned where necessary, to attain moisture contents needed to attain the required compaction.



Further discussions of the above items are presented in subsequent sections of this report.

Pump Station Design Recommendations

Foundations: The valve vault, the wet well, and the generator pad may be supported on a reinforced concrete slab or mat-like foundation bearing on natural soils, weathered bedrock, sound bedrock or controlled compacted fill placed atop of these materials after complete removal of existing fill materials from within the footprint of the structures and up to 5 feet beyond the footprint of the proposed structure and replacement with controlled compacted backfill. The foundations of the electrical building should bear at a minimum depth of 4 feet below the final surrounding exterior grades for protection against frost heave unless the footings bear directly on sound bedrock. The concrete portion of the turned down concrete edges (that is, the haunched/thickened perimeter portion) of the generator pad should also extend a minimum of 4 feet below the final surrounding exterior grades for frost protection. Alternatively, the backfill and/or crushed stone bedding beneath the entire generator pad should consist of non-frost susceptible backfill material (crushed stone) placed such that it extends a minimum of 4 feet below the final surrounding exterior grades.

Foundations supported atop the above-mentioned materials could be designed for maximum net allowable bearing pressures of up to 2 tons per square foot (psf). Foundations supported directly atop bedrock can be designed for up to 6 tsf. All mats and slabs, including the valve vault and the wet well, should be underlain by a minimum 12-inch-thick layer of porous fill (clean crushed stone) to provide a capillary break between the slab/pad and the subgrade soils, unless the design engineers require a thicker section. Pads or mat foundations may be designed assuming a modulus of subgrade reaction of 200 pounds per cubic inch.

The design of the below grade structures should consider a design groundwater elevation of +4 feet or the design flood elevation (if higher) and associated lateral pressures and buoyancy forces. Resistance to uplift may consider



the friction between the backfill and concrete walls using the coefficients provided below plus the dead weight of the structure, only considering the concrete walls and base; that is, the weight of all other proposed appurtenances and connected structures should be neglected. If sufficient resistance with a suitable factor of safety cannot be achieved by using dead loads and sidewall friction, grouted rock anchors would be required. The rock anchors should be designed for an allowable grout-to-rock bond strength of 150 psi (ignoring the top 5 feet of the rock anchor), spaced a minimum of 5 feet center to center. The rock anchors should be provided with double corrosion protection and proof tested upon installation. The designer should confirm that the structure is designed to resist these uplift forces times a factor of safety of 1.3.

Foundations constructed per these recommendations are expected to experience up to 1/2 inch of settlement.

Utilities: Proposed utilities/pipelines, manholes, and associated appurtenant structures may bear on the recompacted existing fill or natural soils after excavation to subgrade levels. Manholes and associated structures should be underlain by a minimum 12-inch layer of crushed stone or more if required by the designers. Utilities should be underlain by a minimum of 6 inches or as required by the designer. In areas where the subgrade soils are loose, soft, and/or extremely wet, overexcavation beyond the minimum bedding requirements may be necessary to develop a stable subgrade. As discussed in more detail later in this report, properly dewatering the excavations is critical and not controlling groundwater could lead to subgrade instability.

When evaluating trench backfill loads, we recommend using the wet soil unit weights in the table provided later in this report. The actual unit weights should be confirmed when the backfill materials are known. The pipeline and associated appurtenances must be designed to resist uplift buoyancy forces using the design groundwater elevations provided above.

In general, trench widths should be determined based on pipe manufacturer recommendations. Trench width should be kept as narrow as possible to reduce the soil loading on pipes, while being wide enough to allow for



access of compaction equipment and proper compaction. The placement of initial fill should be performed in a careful manner particularly in the zone between the bottom of the pipe and pipe spring-line to prevent voids and loose zones and confirm the backfill is firm. If proper installation of initial backfill around pipes is not feasible, use of flowable, lean concrete or controlled low strength material (CLSM) may be considered. A 28-day compressive strength of 150 psi should be specified for such material.

Proximity of adjacent utilities and excavations on the proposed construction should be considered in design.

Lateral Pressures and Sliding Resistance: Below grade walls should be designed to resist lateral earth pressures due to soil and rock weight, neighboring foundation loads, and other surcharges. The following tabulated soil properties should be used for design purposes. Hydrostatic forces below the design groundwater El. +4 feet or DFE, (if higher) should be added.

Soil or Rock Stratum	Total Unit Weight (pcf)	Friction Angle (degrees)	Active Pressure Coefficient (Ka)	At-Rest Pressure Coefficient (Ko)
Existing Fill/Clayey Silts/Silty Sands	120	28	0.36	0.53
Weathered Rock	135	36	0.26	0.41
Sound Bedrock	170	-	-	0.33
Controlled Compacted Granular Fill/Backfill	130	32	0.31	0.47
Crushed Stone Backfill	110	40	0.22	0.36

Note: pcf = pounds per cubic foot

Walls should also be designed for appropriate sloping backfill, surcharges, and seismic loads per the NYSBC. An additional uniform horizontal pressure should be used for design of temporary and permanent walls where



surcharges are anticipated due to, for example, traffic, foundations loads, etc. Such additional uniform horizontal pressure is generally taken as one-half of the anticipated uniform vertical surcharge load.

A temporary rock support system (designed by a New York Professional Engineer) may be required to provide horizontal support for stabilization of potentially unstable rock wedges during construction. Also, although not expected, a permanent rock support system consisting of rock bolts to reduce lateral pressure on below grade walls may be required. The structural design of the below grade walls must account for the lateral earth pressure from the potential rock wedges acting together with hydrostatic forces and other horizontal surcharge pressures. Alternatively, rock cuts could be flattened to 1 horizontal to 2 vertical (1H:2V) slopes starting a minimum of 5 feet away from the base of the excavation and extending upward to mitigate the potential of unsafe conditions during construction such as unstable rock wedges caving into an excavation during construction, or the potential of damage to the walls of below grade pump station structure and the performance of the structure in the permanent condition. The annulus between the rock face/face of excavation and the below grade structure should be backfilled with crushed stone or structural fill in a controlled, compacted manner.

For resisting lateral/sliding forces at the base of foundations or side friction for uplift resistance, the recommended ultimate coefficient of friction between concrete and natural soils, weathered bedrock, or structure fill is 0.35, between concrete and crushed stone is 0.55, and between concrete and sound rock is 0.7.

Seismic Design: Our borings indicate site subsoils would represent a Site Class B, as defined by the NYSBC. Based on this, we recommend that seismic design spectral acceleration parameters of $S_{D5} = 0.14g$ and $S_{D1} = 0.03g$ be used for seismic design purposes.

Construction Recommendations

Site Preparation and Construction Excavations: Initial site preparation should include removal of trees, vegetation, topsoil, and any other objectionable material from within the footprints of the proposed structures and extended



at least five feet beyond their perimeter. Any existing utilities should be relocated outside of the new construction area and abandoned utilities should be completely removed and capped.

It is anticipated that up to 17 feet of excavation is required to construct the proposed wet well with shallower excavations for the valve vault, to remove existing fill beneath the proposed electrical building and the generator pad, and to construct utilities and manholes. For the deeper wet well, it is anticipated that excavations will extend up to 10 feet below the observed bedrock surface and the observed groundwater elevations to construct the proposed structure. The method of excavation support should be selected by the contractor. Dewatering will be critical for the deeper excavation areas. The contract documents should require that support of excavation and dewatering design drawings and calculations, stamped and sealed by a New York Professional Engineer is provided to GZA for review.

The Owner and the Contractor should make themselves aware of and become familiar with applicable local, state, and federal safety regulations, including the current Occupational Safety and Health Administration (OSHA) Excavation and Trench Safety Standards. Construction site safety generally is the sole responsibility of the Contractor, who shall also be solely responsible for the means, methods, and sequencing of construction operations. We are providing this information solely as a service to our client. Under no circumstances should the information provided herein be interpreted to mean that GZA is assuming responsibility for construction site safety or the Contractor's activities, such responsibility is not being implied and shall not be inferred.

The Contractor should be aware that slope height, slope inclination, or excavation depth should in no case exceed those specified in local, state, or federal safety regulations, such as OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations. Such regulations are strictly enforced and, if they are not followed, the Owner, Contractor, and/or earthwork and utility subcontractors could be liable for substantial penalties.



Vertical temporary excavation support may be required to prevent undermining adjacent existing structures, improvements, and utilities. These systems should be designed in accordance with OSHA requirements, assuming “Type C” soils for soils or decomposed bedrock above hard/sound bedrock and above the water table. We expect the firm bedrock will be able to support relatively steep slopes with proper engineering controls and maintenance during construction. We recommend a rock slope angle of no steeper than 1H:6V. However, the slope height should be evaluated during construction by GZA for conditions that may require additional support, such as rock bolts, to stabilize the face for long term exposure to the elements.

Rock Excavations: Large excavation equipment may be suitable to effectively remove weathered rock within some of the excavations. However, extensive rock excavation effort is expected to remove hard/sound bedrock for the construction of the proposed wet well. Hard rock excavation may entail mechanical excavation by chipping with hydraulic hoe-ram/breakers, chemical/mechanical splitting, and/or controlled blasting. The method of excavation is typically a function of the Contractor’s ability, access to the site (which currently is minimal), preference, and cost analysis and perceived risk to adjacent structures. Mechanical chipping will impart a significant amount of low frequency vibrations into the ground which will be transmitted to neighboring structures and improvements. The imparted energy will be attenuated with increasing distance. Low frequency vibrations from mechanical chipping may cause cosmetic damage to adjacent structures.

Chemical or mechanical rock splitting are typically expensive options. They require extensive rock drilling for placement of the expansive chemicals or insertion of mechanical splitters but cause significantly less vibration. Controlled blasting is often less problematic to neighboring buildings with regards to vibrations, when performed properly and with small charges, due to the high frequency of the blast. However, controlled blasting often encounters resistance by the local community. There is also the risk of cosmetic and structural damage from blast-induced vibrations on adjacent structures, particularly for frequencies less than 20 Hertz (Hz).



Where blasting or chemical splitting is used, line drilling and channel drilling may be used to reduce rock damage and overbreak outside of the planned excavation limits and may also reduce the propagation of vibrations to adjacent structures and utilities. The Contractor's proposal for the project should provide their planned excavation methodology for GZA's review. Any disturbed or loose rock fragments must be removed from the final subgrade.

Construction Dewatering: Based on the observed and estimated groundwater levels and the proposed construction depths, dewatering will be necessary. The Contractor should be prepared to evacuate the groundwater which enters excavations from the soil layers and from fractures in the rock to allow construction of the proposed wet well to proceed. The Contractor can consider grouting the soil/rock interface around the excavation perimeter to reduce the water flow into the excavation; additional grouting may be utilized during excavation within seams and joints to further reduce the water flow. Furthermore, the use of well points and/or closely spaced wells could be required. Conventional sump pumps may suffice for the remainder of the project where shallower excavations are needed depending on the excavation depth below the groundwater levels. The dewatering system is the sole responsibility of the contractor and should be designed and installed by a specialty contractor familiar with conditions in the area and should maintain the groundwater levels a minimum of 2 feet below the base of the excavations to help maintain stable subgrades. The dewatering means and methods are the sole responsibility of the contractor. Dewatering should be carefully planned and executed to prevent damage or settlement of nearby structures and utilities. Appropriate screens and filters should be provided to minimize the pumping of fines. All discharge of construction water should be performed in accordance with the requirements of your environmental consultant and any local requirements.

As the dewatering and excavation and support requirements are related, it is our opinion that the design of both systems should be coordinated by the contractor who will ultimately be responsible for their performance, as well



as any damage to adjacent improvements caused by the construction. Precautions will be needed during dewatering to limit the risk of heave or settlement of adjacent structures. Dewatering design should be performed by a New York Professional Engineer.

Earthwork - Subgrade Preparation, Backfilling, and Soils Reuse: Moisture content tests performed on existing fill and natural soils that are expected to be excavated as part of the proposed work indicate that moisture contents range between 9 and 20 percent. Based on this, much of these materials are likely too wet for immediate reuse in their current condition. In order to adequately place and compact these materials to 95 percent of maximum dry density per ASTM D-1557, the materials will need to be segregated, spread, scarified and aerated/dried to acceptable moisture levels to permit adequate compaction before being reused as controlled compacted fill and/or backfill. If space allows and a staging area can be provided by the project planner to facilitate such an operation, excavated materials may be reused as backfill provided that the materials are acceptable from an environmental standpoint. Excavated material should be culled of organic matter, foreign debris, and deleterious materials prior to reuse.

Portions of the excavated fill (upper siltier portions observed in all borings except B-4) and the natural silty/clayey soils would generally be poorly suited for reuse as fill as they would be highly susceptible to moisture related stability and compaction issues and would provide potential construction delays for drying and re-compaction work. These materials would be better suited for use in non-structural landscaped areas. More granular portions of the existing fill, natural gravelly silty sands, or well fragmented rock broken or crushed into primarily sand and gravel size fragments, would provide a fair to good source of materials for reuse as controlled compacted fill provided, they are deemed acceptable environmentally (by others) and are conditioned where necessary, to attain moisture contents needed to attain the required compaction. Excavated cobbles or boulders or rock fragments more than six inches in size would generally not be desired for reuse and would have to be segregated



and removed or broken into smaller pieces prior to reuse. Crushing, pulverization and/or screening could be considered to create a sand and gravel mix out of excavated rock fragments to increase the potential for reuse of these materials as fill.

After excavations are complete, any exposed soil subgrade should be proof compacted to a dense and stable condition to the satisfaction of the inspecting geotechnical engineer prior to placement of new fill or construction. Soft areas identified during excavation should be over-excavated to a firmer subgrade and then backfilled with controlled compacted fill, stone bedding or lean concrete. This over-excavation may typically be limited to 2-feet for proposed pipeline trenches. A GZA representative should be present to observe the subgrades and check that appropriate conditions are present.

We recommend that trench backfill/restoration consist of a 6-inch bedding of 3/4-inch crushed stone or a gravel backfill. The initial backfill material, which is material required adjacent to the pipeline and up to 12 inches above the pipeline, should consist of the same. Crushed stone should have a maximum particle size of 1-inch and less than 5 percent passing the No. 200 sieve.

Backfill placed atop the initial fill may consist of reused excavated material (if permitted by appropriate agencies) provided the material is prepared as discussed above. Otherwise, the remaining backfill should be performed using imported granular material meeting the site engineer or local (town/county) requirements. At a minimum, imported materials for the remaining backfill should be free of organic and deleterious debris, non-plastic, and less than 3-inches in maximum particle size with no more than 15 percent passing the No. 200 sieve.

All backfill should be installed in lifts on the order of 12 inches or less in loose thickness and thoroughly compacted to at least 95 percent of its maximum dry density as determined by the ASTM D-1557 test procedure. If crushed stone is used compaction testing is not practical but it should be still placed in lifts and observed by GZA.



Assessment and Monitoring of Adjacent Structures: The pre-construction conditions of the adjacent structures, utilities, and site improvements should be documented prior to the start of any intrusive activities (including excavations) at the project site. This includes photographing and measuring all existing conditions and defects within a 100-foot radius of proposed work to provide a quantifiable baseline record prior to construction. Instrumentation consisting of crack gages, vibration monitors and/or survey points should be installed at applicable locations, and baseline values recorded. Deflection readings should be taken twice daily during excavation and excavation support.

Controlled blasting or mechanical excavation will create vibrations that will be felt by neighboring structures. Vibration monitoring should be performed continuously when working within 100 feet of neighboring structures. Where measured vibrations exceed 1.0 inch per second (ips) at a frequency below 50 Hz or exceed 2.0 ips above 50 Hz at a nearby structure, the work operations should be revised. Project specific vibration limits should be evaluated upon the selection of Contractor's means and methods. The ability to predict the amount of vibration, settlement, and damage that will be caused by work activities and that can be tolerated by adjacent structures is beyond the scope of this report, but should be evaluated prior to instituting the monitoring program.

The Contractor performing the work should coordinate work with MTA Metro North and note that their structures are located in the vicinity of the proposed site. The contractor should confirm any vibration criteria or blasting limitations with the town, MTA, and the local authorities prior to the start of construction.

We appreciate the opportunity to work with you on this project. Should you have any questions, please contact us.

Please contact us if you have any questions regarding this report.



The following Plates and Appendices are attached and complete this report:

Plate 1 - Site Location Map
Plate 2 - Plot Plan
Plates 3A through 3F - Boring Logs
Plate 4 - Unified Soil Classification System
Plates 5 - Gradation Curves
Plate 6 - Rock Core Classification System
Appendix I - Limitations
Appendix II - Rock Core Photograph

Respectfully submitted,

GZA GeoEnvironmental of New York

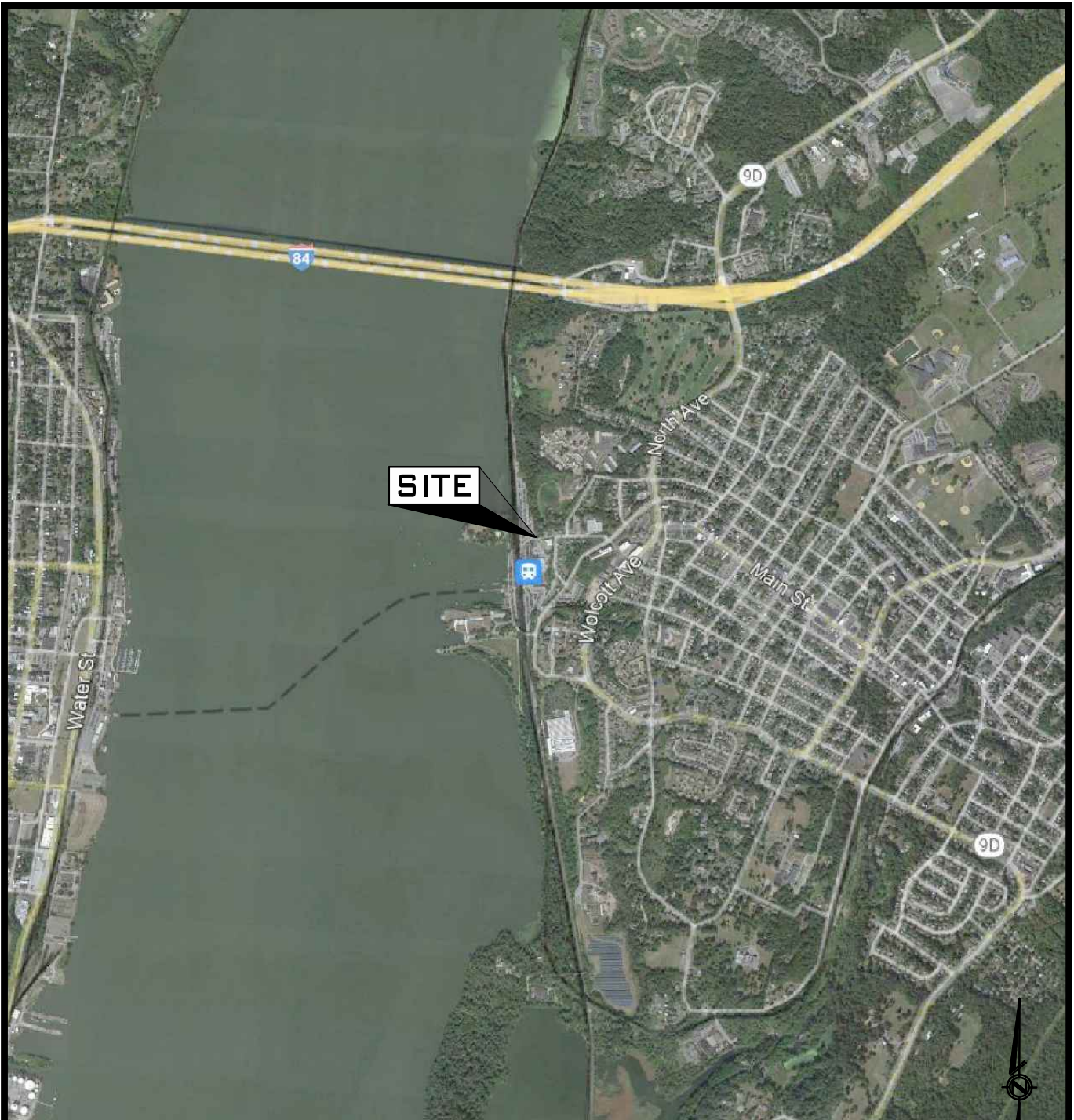
A handwritten signature in blue ink, appearing to read 'Andrew Rizk', with a long horizontal flourish extending to the right.

Andrew Rizk, P.E.
Vice President

A handwritten signature in blue ink, appearing to read 'Mark R. Denno', with a long horizontal flourish extending to the right.

Mark R. Denno, P.E.
Consultant/Reviewer

AR:MRD/mh
(1 copy submitted via e-mail)



Aerial Photo courtesy of Google Earth Pro



GZA GeoEnvironmental of New York
Engineers and Scientists

Known for excellence. Built on trust
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SITE LOCATION MAP

**PROPOSED WEST MAIN STREET
PUMP STATION UPGRADES
BEACON, NEW YORK
CITY OF BEACON**

JOB NO.

26.0092615.00

FILE NO.

—

DR. BY

VJD

CHK. BY

AR

DATE

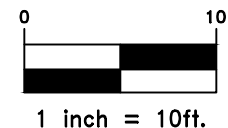
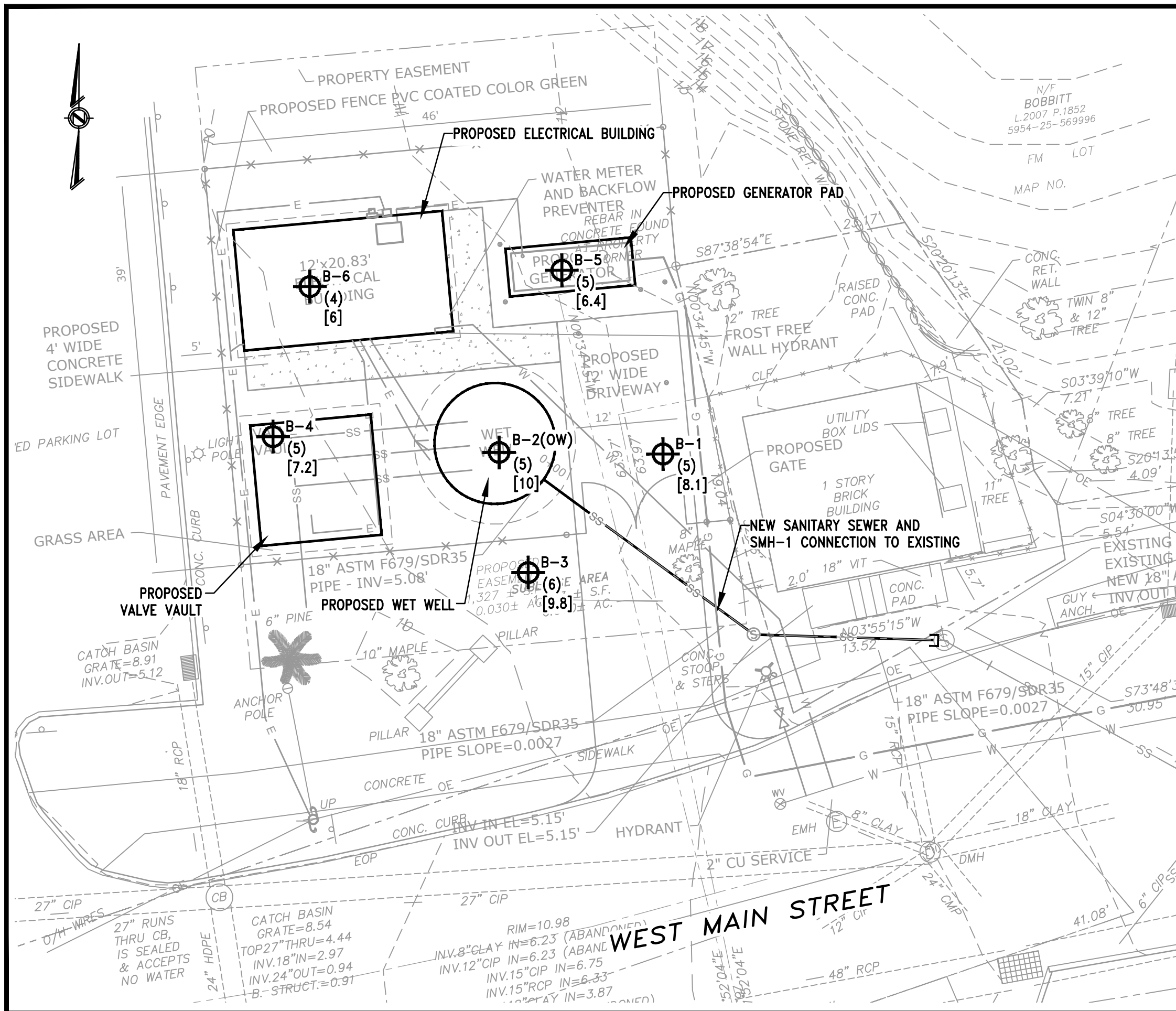
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SCALE

1"=2,000'

PLATE

1



KEY:



NUMBER AND APPROXIMATE LOCATION OF BORINGS PERFORMED FOR THIS STUDY

(5)

APPROXIMATE FILL THICKNESS IN FEET

[8.1]

APPROXIMATE DEPTH IN FEET TO DRILLING REFUSAL ON BEDROCK

(OW)

APPROXIMATE LOCATION WHERE GROUNDWATER MONITORING WELL WAS INSTALLED

NOTES:

1. This drawing is part of GZA, GeoEnvironmental of New York, Report No. 26.0092615.00 and should be read together with the report for complete evaluation.
2. General layout was obtained from a drawing prepared by Tighe & Bond Eng., entitled "Site Plan" dated 1/2022, scale 1"= 10'.

PLOT PLAN

PROPOSED WEST MAIN STREET
PUMP STATION UPGRADES
BEACON, NEW YORK
CITY OF BEACON



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JOB NO.

26.0092615.00

FILE NO.

-

DR. BY
VJD

CHK. BY
AR

DATE
4/13/22

SCALE
1"= 10'

PLATE
2

TEST BORING LOG



MTA, a Division of GZA
GeoEnvironmental, Inc.
Engineers and Scientists

City of Beacon, New York
West Main Street Pump Station Upgrades

EXPLORATION NO.: B-1
SHEET: 1 of 1
PROJECT NO: 26.0092615.00
REVIEWED BY: Andrew Rizk

Logged By: A. Amador
Drilling Co.: Craig Test Borings
Driller: Nick Beehler

Type of Rig: Track Rig
Rig Model: CME 55LC
Drilling Method: Wash

Boring Location: See Plan
Final Boring Depth (ft.): 8.1
Ground Surface Elev. (ft.): 9.5
Date Start - Finish: 3/31/2022 - 3/31/2022

Hammer Type: Automatic Hammer

Hammer Weight (lb.): 140

Hammer Fall (in.): 30

Auger or Casing O.D./I.D Dia (in.): 4.5/4

Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
3/31/22		NE	

Depth (ft)	Sample				Coring Time (min/ft)	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
	No.	Depth (ft.)	Blows (per 6 in.)	SPT Value						
5	S1	0-2	2 2 2 2	4			2" Topsoil		18.5	
							Fill - Gray-brown silt, little fine gravel, little fine sand, with roots, brick and cinders (very moist)			
	S2	2-4	4 5 5 6	10			Fill - Black and brown fine to medium sand, little fine gravel fragments, little silt, with cinders, brick, ceramic and coal (moist)		19.7	
	S3	4-6	8 5 6 50	11						
						ML	Brown clayey silt, little fine gravel, little fine to coarse sand (moist)(stiff)			
5	S4	6-8	21 30 27 22	57		GM	Gray/black weathered bedrock fragments, little fine to coarse sand, little silt			
	S5	8-8.1	50/1"	R			- sampler refusal @ 8.1'			
							End of exploration at 8.1 feet. Groundwater not encountered			
10										
15										
20										
25										

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3A

TEST BORING LOG



MTA, a Division of GZA
GeoEnvironmental, Inc.
Engineers and Scientists

City of Beacon, New York
West Main Street Pump Station Upgrades

EXPLORATION NO.: B-2
SHEET: 1 of 1
PROJECT NO: 26.0092615.00
REVIEWED BY: Andrew Rizk

Logged By: A. Amador
Drilling Co.: Craig Test Borings
Driller: Nick Beehler

Type of Rig: Track Rig
Rig Model: CME 55LC
Drilling Method: Wash

Boring Location: See Plan
Final Boring Depth (ft.): 20
Ground Surface Elev. (ft.): 9.5
Date Start - Finish: 3/30/2022 - 3/30/2022

Hammer Type: Automatic Hammer

Hammer Weight (lb.): 140

Hammer Fall (in.): 30

Auger or Casing O.D./I.D Dia (in.): 4.5/4

Rock Core Size: NQ

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
3/30/22	2:30 pm	7	2 hrs
3/31/22	11:50 pm	7.3	24 hrs

Depth (ft)	Sample				Coring Time (min/ft)	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
	No.	Depth (ft.)	Blows (per 6 in.)	SPT Value						
5 										

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3B

TEST BORING LOG



MTA, a Division of GZA
GeoEnvironmental, Inc.
Engineers and Scientists

City of Beacon, New York
 West Main Street Pump Station Upgrades

EXPLORATION NO.: B-3
SHEET: 1 of 1
PROJECT NO: 26.0092615.00
REVIEWED BY: Andrew Rizk

Logged By: A. Amador
Drilling Co.: Craig Test Borings
Driller: Nick Beehler

Type of Rig: Track Rig
Rig Model: CME 55LC
Drilling Method: Wash

Boring Location: See Plan **Final Boring Depth (ft.):** 9.8
Ground Surface Elev. (ft.): 9.5
Date Start - Finish: 3/20/2022 - 3/30/2022

Hammer Type: Automatic Hammer

Hammer Weight (lb.): 140

Hammer Fall (in.): 30

Auger or Casing O.D./I.D Dia (in.): 4.5/4

Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
3/30/22		7	30 min

Depth (ft)	Sample				Coring Time (min/ft)	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
	No.	Depth (ft.)	Blows (per 6 in.)	SPT Value						
5	S1	0-2	3 4 11 9	15			2 " Topsoil	5	17.6	
							Fill - Brown silt, little fine gravel, little fine to medium sand, with coal fragments, brick, cinders, metal (very moist)			
	S2	2-4	5 6 7 6	13			Fill - Black fine to medium sand, little silt, trace fine gravel, trace roots, with brick and coal fragments (very moist)			
	S3	4-6	8 13 24 8	37			- grading to and clayey silt			
	S4	6-8	4 3 3 4	6		ML	Brown clayey silt, little fine gravel, little fine to coarse sand, trace roots (moist)(medium) (PP - 1.3 TSF)			
10	S5	8-9.8	5 8 36 50/3"	44		GM	Gray-black weathered/decomposed bedrock fragments, little fine to coarse sand, little silt (dry)		14.4	
							End of exploration at 9.8 feet. Groundwater encountered @ 7'			
15										
20										
25										

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3C

TEST BORING LOG



MTA, a Division of GZA
GeoEnvironmental, Inc.
Engineers and Scientists

City of Beacon, New York
 West Main Street Pump Station Upgrades

EXPLORATION NO.: B-4
SHEET: 1 of 1
PROJECT NO: 26.0092615.00
REVIEWED BY: Andrew Rizk

Logged By: A. Amador
Drilling Co.: Craig Test Borings
Driller: Nick Beehler

Type of Rig: Track Rig
Rig Model: CME 55LC
Drilling Method: Wash

Boring Location: See Plan **Final Boring Depth (ft.):** 7.2
Ground Surface Elev. (ft.): 9.5
Date Start - Finish: 3/31/2022 - 3/31/2022

Hammer Type: Automatic Hammer

Hammer Weight (lb.): 140

Hammer Fall (in.): 30

Auger or Casing O.D./I.D Dia (in.): 4.5/4

Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
3/31/22		6.5	30 min

Depth (ft)	Sample				Coring Time (min/ft)	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
	No.	Depth (ft.)	Blows (per 6 in.)	SPT Value						
5	S1	0-2	4 6 6 8	12			2" Topsoil	5	8.6	
	S2	2-4	4 8 8 10	16			Fill - Gray-brown fine to medium sand, some fine gravel, little to some silt, with trace coal fragments and cinders (moist)			
	S3	4-6	8 12 12 9	24		SM	Brown gray fine to medium sand, and silt (moist)(medium dense)			
	S4	6-7.2	4 14 50/2"	R		GM	Gray weathered bedrock fragments, with clayey silt, trace fine to medium sand (wet)			
10							End of exploration at 7.2 feet. Groundwater encountered @ 6.5'			
15										
20										
25										

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3D

TEST BORING LOG



MTA, a Division of GZA
GeoEnvironmental, Inc.
Engineers and Scientists

City of Beacon, New York
 West Main Street Pump Station Upgrades

EXPLORATION NO.: B-5
SHEET: 1 of 1
PROJECT NO: 26.0092615.00
REVIEWED BY: Andrew Rizk

Logged By: A. Amador
Drilling Co.: Craig Test Borings
Driller: Nick Beehler

Type of Rig: Track Rig
Rig Model: CME 55LC
Drilling Method: Wash

Boring Location: See Plan **Final Boring Depth (ft.):** 6.4
Ground Surface Elev. (ft.): 9.5
Date Start - Finish: 3/30/2022 - 3/30/2022

Hammer Type: Automatic Hammer

Hammer Weight (lb.): 140

Hammer Fall (in.): 30

Auger or Casing O.D./I.D Dia (in.): 4.5/4

Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
3/30/22		NE	

Depth (ft)	Sample				Coring Time (min/ft)	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
	No.	Depth (ft.)	Blows (per 6 in.)	SPT Value						
5	S1	0-2	1 3 7 7	10			2" Topsoil	5	16.5	
							Fill - Brown silt, little fine gravel, little fine to coarse sand, trace roots, with coal fragments			
	S2	2-4	21 10 9 14	19			Fill - Black-brown fine to medium sand, some silt, little fine gravel, with brick, cinders and roots			
	S3	4-6	30 25 29 60	54		GM	Gray weathered bedrock fragments, some silt, some sand (dry)			
	S4	6-6.4	50/4"	R						
10							End of exploration at 6.4 feet. Groundwater not encountered			
15										
20										
25										

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3E

TEST BORING LOG



MTA, a Division of GZA
GeoEnvironmental, Inc.
Engineers and Scientists

City of Beacon, New York
 West Main Street Pump Station Upgrades

EXPLORATION NO.: B-6
SHEET: 1 of 1
PROJECT NO: 26.0092615.00
REVIEWED BY: Andrew Rizk

Logged By: A. Amador
Drilling Co.: Craig Test Borings
Driller: Nick Beehler

Type of Rig: Track Rig
Rig Model: CME 55LC
Drilling Method: Wash

Boring Location: See Plan **Final Boring Depth (ft.):** 11
Ground Surface Elev. (ft.): 9.5
Date Start - Finish: 3/31/2022 - 3/31/2022

Hammer Type: Automatic Hammer

Hammer Weight (lb.): 140

Hammer Fall (in.): 30

Auger or Casing O.D./I.D Dia (in.): 4.5/4

Rock Core Size: NQ

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
3/30/22		NE	

Depth (ft)	Sample				Coring Time (min/ft)	Symbol	Sample Description and Identification	Depth (ft)	Water Content (%)	Remark
	No.	Depth (ft.)	Blows (per 6 in.)	SPT Value						
5	S1	0-2	3 9 13 12	22	2.6 2.9 3.2 3.7 4.3		2"Topsoil	5	14.8	1
							Fill - Gray-brown silt, little fine to medium sand, little fine gravel, with coal fragments and brick (moist)			
	S2	2-4	9 8 7 7	15			Fill - Black fine to medium sand, some fine gravel, little silt, with cinders, brick, roots and coal fragments (moist)			
	S3	4-5.2	12 14 50/2"	R			- sampler refusal at 5.2' and drilling refusal @ 6'			
							Weathered bedrock fragments			
10							ROCK CORE RUN NO. 1: 6' to 11' REC = 50% RQD = 16% Moderately hard, slightly to very slightly weathered, fine to medium gravel, gray-black calcareous meta-conglomerate bedrock, very close to close, moderately dipping, extremely fractured	10		
15							End of exploration at 11 feet. Groundwater not encountered			
20										
25										

REMARKS

1 - Water loss observed below 7' during rock coring

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Plate No.: 3F

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS More than 50% of material is LARGER than No. 200 Sieve	GRAVEL & GRAVELLY SOILS More than 50% of coarse fraction RETAINED on No. 4 Sieve	CLEAN GRAVELS (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amount of fines)	GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
			GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SAND AND SANDY SOILS More than 50% of coarse fraction PASSING a No. 4 Sieve	CLEAN SAND (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)	SP	Poorly-graded sands, gravelly sands, little or no fines.
			SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS More than 50% of material is SMALLER than No. 200 Sieve.	SILTS AND CLAYS Liquid limit LESS than 50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.	
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.	
		OL	Organic silts and organic silty clays of low plasticity.	
	SILTS AND CLAYS Liquid limit GREATER than 50	MH	Inorganic silts, micaceous or diatomaceous fine sand or silty soils.	
		CH	Inorganic clays of high plasticity, fat clays.	
		OH	Organic clays of medium to high plasticity, organic silts.	
		HIGHLY ORGANIC SOILS		PT

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS.

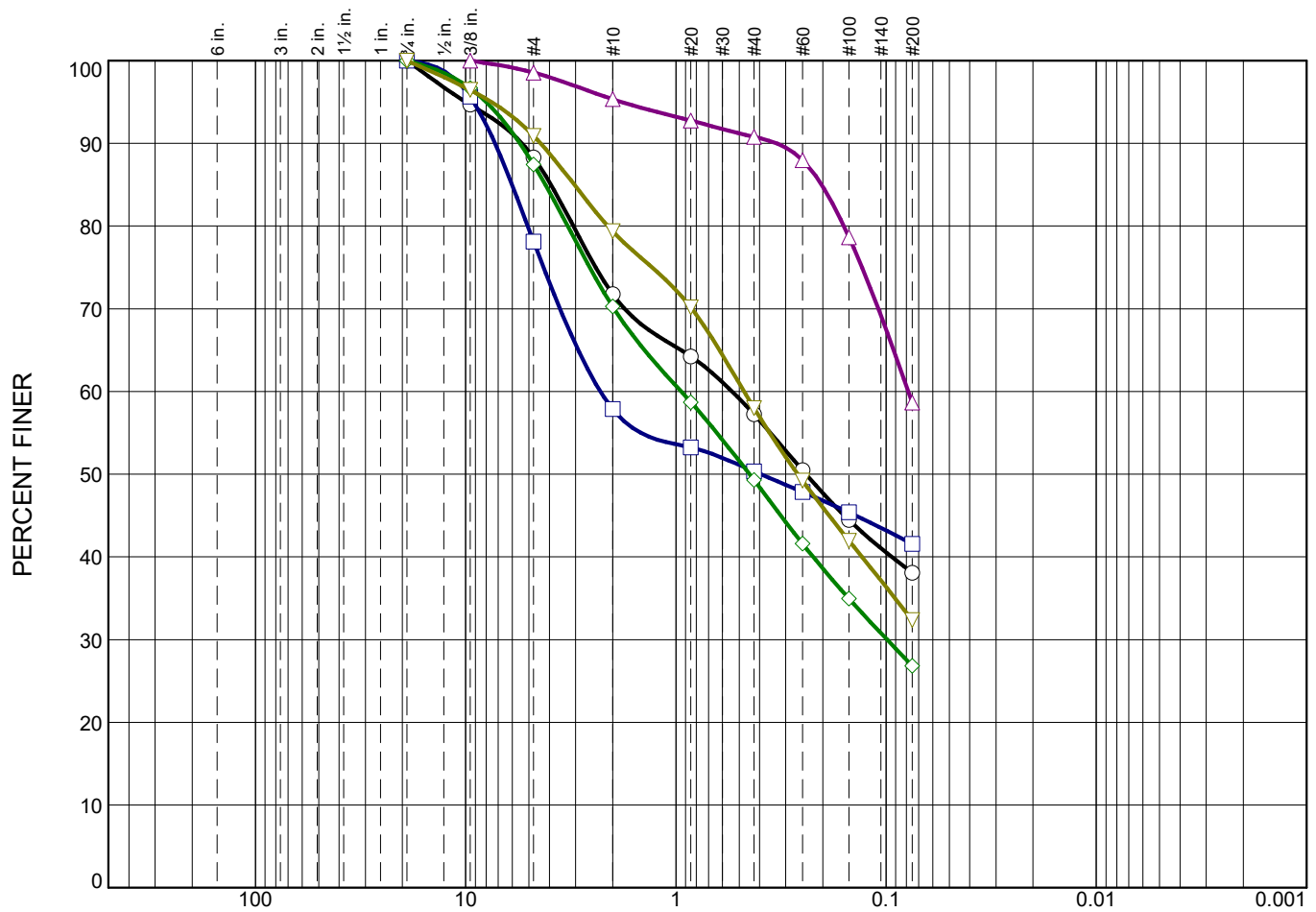
GRADATION*		COMPACTNESS*		CONSISTENCY*	
		sand and/or gravel		clay and/or silt	
% Finer by Weight		Relative Density		Range of Shearing Strength in Pounds per Square Foot	
Trace	0% to 10%	Loose	0% to 40%	Very Soft	less than 250
Little	10% to 20%	Medium Dense	40% to 70%	Soft	250 to 500
Some	20% to 35%	Dense	70% to 90%	Medium	500 to 1000
And	35% to 50%	Very Dense	90% to 100%	Stiff	1000 to 2000
				Very Stiff	2000 to 4000
				Hard	Greater than 4000

*Values are from laboratory or field test data, where applicable. When no testing was performed, values are estimated.

UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL CLASSIFICATION CHART

Gradation Curve(s)



GRAIN SIZE - mm.

	% Cobbles	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	11.7	16.5	14.6	19.1	38.1	
□	0.0	0.0	21.9	20.2	7.6	8.7	41.6	
△	0.0	0.0	1.5	3.2	4.5	32.1	58.7	
◇	0.0	0.0	12.6	17.1	21.0	22.5	26.8	
▽	0.0	0.0	9.1	11.5	21.4	25.6	32.4	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	B-1	S1	0-2	Fine to coarse Sand, and Silt, little fine Gravel (MC=18.5%)	Fill
□	B-2	S1	0-2	Silt, and fine to coarse Sand, some fine Gravel (MC=16.0%)	Fill
△	B-2	S4	6-8	Silt, and fine to medium Sand, trace fine Gravel (MC=19.6%)	ML
◇	B-4	S3(Top)	4-6	Fine to coarse Sand, some Silt, little fine Gravel (MC=18.0%)	Fill
▽	B-4	S3(Bottom)	4-6	Fine to coarse Sand, some Silt, trace fine Gravel (MC=10.2%)	SM

Melick-Tully & Associates
a Division of GZA GeoEnvironmental, Inc.
South Bound Brook, NJ

Client: City of Beacon

Project: West Main Street Pump Station Upgrades - Beacon, NY

Project No.: 26.0092615.00

Plate 5

ENGINEERING ROCK CLASSIFICATION
AND CORE DESCRIPTION CHART (1)

DESCRIPTIVE TERMINOLOGY FOR JOINT SPACING

<u>Description Term</u>	<u>Spacing of Joints</u>
Very Close	Less than 2 inches
Close	2 inches to 1 foot
Moderately Close	1 foot to 3 feet
Wide	3 feet to 10 feet
Very Wide	Greater than 10 feet

RELATIONSHIP OF RQD AND ROCK QUALITY

<u>Rock Quality Designation (RQD) (2)</u>	<u>Description of Rock Quality</u>
0 – 25%	Very Poor
25 – 50%	Poor
50 – 75%	Fair
75 – 90%	Good
90 – 100%	Excellent

- (1) Core description system is based on a suggested system proposed in the ASCE Rock Mechanics Seminar in April and May of 1968 entitled “Geologic Considerations of Rock Mechanics” as presented by Don V. Deere.
- (2) “Rock Quality Designation” is defined as a modified core recovery ratio which considers only pieces of core that are at least 4 inches long. Obvious features induced by drilling are ignored in this system.

APPENDIX I

APPENDIX I

Limitations

A. Subsurface Information

Locations: The locations of the explorations were determined by survey performed by others via stakes that were left in the field. Elevations of the explorations were approximately determined by interpolation between contours shown on topographic plans provided to us by the site engineer. The locations and elevations of the explorations should be considered accurate only to the degree implied by the method used.

Interface of Strata: The stratification lines shown on the individual logs of the subsurface explorations represent the approximate boundaries between soil types, and the transitions may be gradual.

Field Logs/Final Logs: A field log was prepared for each exploration by a member of our staff. The field log contains factual information and interpretation of the soil conditions between samples. Our recommendations are based on the final logs as shown in this report and the information contained therein, and not on the field logs. The final logs represent our interpretation of the contents of the field logs, and the results of the laboratory observations and/or tests of the field samples.

Water Levels: Water level readings have been made in the explorations at times and under conditions stated on the individual logs. These data have been reviewed and interpretations made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater will occur due to variations in rainfall, tides, temperature, and other factors.

Pollution/Contamination: Unless specifically indicated to the contrary in this report, the scope of our services was limited only to investigation and evaluation of the geotechnical engineering aspects of the site conditions, and did not include any consideration of potential site pollution or contamination resulting from the presence of chemicals, metals, radioactive elements, etc. This report offers no facts or opinions related to potential pollution/contamination of the site.

Environmental Considerations: Unless specifically indicated to the contrary in this report, this report does not address environmental considerations which may affect the site development, e.g., wetlands determinations, flora and fauna, wildlife, etc. The conclusions and recommendations of this report are not intended to supersede any environmental conditions which should be reflected in the site planning.

B. Applicability of Report

This report has been prepared in accordance with generally accepted soils and foundation engineering practices for the exclusive use of the City of Beacon for specific application to the design of the proposed pump station upgrades. No other warranty, expressed or implied, is made.

This report may be referred to in the project specifications for general information purposes only but should not be used as the technical specifications for the work, as it was prepared for design purposes exclusively.

C. Reinterpretation of Recommendations

Change in Location or Nature of Facilities: In the event that any changes in the nature, design or location of the facilities are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed, and conclusions of this report modified or verified in writing.

Changed Conditions During Construction: The analyses and recommendations submitted in this report are based in part upon the data obtained from six widely spaced test borings performed for this study. The nature and extent of variations between the explorations may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

Changes in State-of-the-Art: The conclusions and recommendations contained in this report are based upon the applicable standards of our profession at the time this report was prepared.

D. Use of Report by Prospective Bidders

This soil and foundation engineering report was prepared for the project by GZA GeoEnvironmental of New York (GZA) for design purposes and may not be sufficient to prepare an accurate bid. Contractors utilizing the information in the report should do so with the express understanding that its scope was developed to address design considerations. Prospective bidders should obtain the owner's permission to perform whatever additional explorations or data gathering they deem necessary to prepare their bid accurately.

E. Construction Observation

We recommend that GZA be retained to provide on-site soils engineering services during the earthwork construction and foundation phases of the work. This is to observe compliance with the design concepts and to allow changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

APPENDIX II
Rock Core Photograph



Photographic Log

Client Name: The City of Beacon		Site Location: West Main Street Pump Station Upgrades	Project No. 26.0092615.00
Photo No. 1	Date: 03/30/22		
Direction Photo Taken: --			
Rock Core Box Key: Boring 2 Run 1 – 10'-15' Rec: 100% RQD: 62% Boring 2 Run 2 – 15'-20' Rec: 100% RQD: 82% Boring 6 Run 1 – 6'-11' Rec: 50% RQD: 16% Empty			

**Metro-North Guidelines for Insurance
&
Sample ACORD Forms**

MTA GUIDELINES for INSURANCE SUBMISSION & GENERAL INSTRUCTIONS FOR COMPLETING ACORD FORMS

APPLICABLE TO ALL MTA/AGENCY AGREEMENTS

Policies must be written by carriers with an AM Best rating of A-/VII or better to be acceptable to the MTA & its agencies.

I. INTRODUCTION

This instruction sheet details mandatory acceptance guidelines for providing evidence of insurance to the MTA. It is divided into **three parts**:

I. the Introduction – page 1

II. General Insurance Requirements (Highlights Only), (pages 1-2)

III. Specific Requirements for completing ACORD forms 25, 101 and 855 (pages 3-4)

Read this document carefully and comply with all requirements outlined herein. You must also read your agreement for specific insurance requirements.

A. Initial Insurance

Before any work begins, the Contractor must submit evidence of all insurance policies to the Agency/MTA at the address provided in the Insurance Section C of the solicitation documents:

Certificates of insurance may be submitted as evidence of insurance unless otherwise noted in the Agreement. The following ACORD forms (or their equivalent) are suitable for submission of insurance:

- a. ACORD 25 (2016/03) – Certificate of Liability Insurance
- b. ACORD 101 (2008/01) – Additional Remarks Schedule
- c. ACORD 855 (2014/05) – New York Construction Certificate of Liability Insurance Addendum

B. Policy expiration dates may not be within 30 days of submission unless written assurance from the authorized broker or insurer that the policy/policies will be renewed and submitted with the same terms and conditions as the certificate.

C. Renewal Insurance: Evidence of renewal insurance must be submitted electronically. It should be sent to the contract-specific email address received from Complianz™, the MTA's Certificate of Insurance Tracking System. **Do not mail hard copies to risk management.**

II. GENERAL INSURANCE REQUIREMENTS (Highlights Only. Please refer to the agreement for specific insurance requirements):

A. Workers' Compensation –

- The New York State Insurance Fund form is acceptable.
- If a company is located out of state, an "Other States" endorsement is required.
- Exempt organizations may provide the approved CE-200 or documentation from their accountant or attorney confirming their exempt status.

B. General Liability (refers to primary and umbrella/excess liability policies)

- The General Liability policy shall provide coverage no less broad than that of the current ISO Commercial General Liability Insurance policy (Occurrence Form, number CG 00 01).
- The policy shall not contain any contractual exclusion relative to Labor Laws or any other exclusions or limitations directed toward any types of projects, materials or processes involved in the contract.
- The umbrella/excess liability policies shall be written on a “drop-down” and “following form” basis, with only such exceptions expressly approve in writing by MTA. Such insurance shall be maintained for the entire term of the contract.
- A physical copy of the required additional insured endorsements (Refer to your agreement or Solicitation document).

C. Railroad Protective Liability (RRPL)/Builder’s Risk (including Installation Floater)

- An insurance Binder must be provided pending issuance of actual policy.
- The binder must list all required “Named” and/or “Additional Named” insureds, as applicable.
- Actual policies must be submitted within 30 days from issuance of Binder.

D. Environmental Coverages (contractor or sub-contractor may provide):

- Contractor’s pollution liability coverage must be endorsed to include the additional insureds per terms of contract, and a copy of the physical endorsement must accompany the certificate of insurance.
- Pollution legal liability coverage must be Evidence can be satisfied by ONE of the following”:
 - Standalone pollution legal liability policy listing the non-owned disposal site;
 - A non-owned disposal site endorsement to the contractor’s pollution liability policy;
 - A certificate of insurance from the disposal facility adding the applicable agency/agencies as additional insured;
- The hauler must provide evidence of their business auto liability policy with copies of the MCS90 & CA9948 endorsement.

E. Joint Venture

- If the Contractor/Consultant is a joint venture, the joint venture shall provide evidence of liability insurance in the name of the joint venture.
 - If insurance is not purchased in the name of the joint venture, the member with the majority ownership interest in the joint venture must endorse its general liability policy to name the joint venture as an “Additional Named” insured.

III. SPECIFIC REQUIREMENTS FOR COMPLETING ACORD 25, 101 and 855

Certain forms have special guidelines, all of which are included in the sample forms that you will receive in your solicitation packet. Please adhere to those guidelines as you fill out ACORD 25, 101 and 855. In addition, please take note of the following special instructions:

A. For ACORD 25

This form is your certificate of liability insurance. You are required to fill out the form's fields as indicated below. (Refer to your agreement for detailed insurance requirements):

a. General Liability

- i. Indicate applicable self-insured retention for policy.
- ii. General aggregate limit must indicate whether it applies for policy, project, or location.

b. Workers' Compensation

- i. Details must be entered for USLH, Jones Act and "Other States" coverage in adjoining row of blank boxes, if applicable.
- ii. Per Statute requirements must be referenced in limits column.

c. Umbrella/Excess Policy

- i. Umbrella and Excess coverages must be denoted by corresponding checkboxes. Underlying policies are to be identified in Additional Remarks Schedule (ACORD 101) to verify adequate insurance.

d. Provide the following information in the Description of Operations/Locations section:

- i. The Contract "*reference number*" provided in solicitation and/or awarded contract: **Provide ONE of the following: Purchase Order (PO No), SSE ID, Requisition (REQ ID) or Contract ID. For example, if you are providing a Purchase Order number, your answer should say "PO #" followed by the actual number.)**
- ii. Contract name: A short description of work being performed.
- iii. Contract type: Operating, Capital, Not for Benefit, Other. **(Provide ONE. If you choose OTHER, please include specifics.)**
- iv. List required Indemnities per contract or on Acord 101 if additional space is needed. They can be copied from MTA website. Go to this Landing page, then follow instructions: <http://www.mta.info/vendor-insurance>

e. Certificate Holder

List the Agency for whom the work will be performed using this format:

Agency Name/MTA

(Example: New York City Transit Authority/MTA

c/o MTA Risk and Insurance Management

2 Broadway, 21st Floor

New York, NY 10004

f. Signature of Authorized Representative

For ACORD 101

Use this form to provide evidence of additional required coverages that could not be provided on ACORD 25 and other comments. For example you should innumerate that you are compliant with required policy endorsements. **See instructions provided on the sample forms:**

- i. List additional Comments/Indemnitees
- ii. Demonstrate that you are compliant with required policy endorsements by enumerating them here. **For example, contractor's policies provided to the Additional Insureds is primary and non-contributory**

FOR ACORD 855

Use this form for agreements involving construction.

- i. **Please note:** When you fill out ACORD 855, you must fill out all the requested information as indicated in red type on the sample form you. Where the "Yes" box is checked on items on the sample form, you must also be able to truthfully check "Yes" to all of the corresponding items on your form or your application will not be approved.
- ii. Attach ACORD 855 to ACORD 25 and ACORD 101, when applicable, when you make your submission.



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:	
	PHONE (A/C, No, Ext):	FAX (A/C, No):
INSURED	E-MAIL ADDRESS:	
	INSURER(S) AFFORDING COVERAGE	
	N/A C#	
	INSURER A:	
	INSURER B:	
	INSURER C:	
	INSURER D:	
	INSURER E:	
	INSURER F:	

COVERAGES**CERTIFICATE NUMBER:****REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
	COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input type="checkbox"/> OCCUR SIR GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC OTHER:						EACH OCCURRENCE \$ DAMAGE TO RENTED PREMISES (Ea occurrence) \$ MED EXP (Any one person) \$ PERSONAL & ADV INJURY \$ GENERAL AGGREGATE \$ PRODUCTS - COMP/OP AGG \$ \$
	AUTOMOBILE LIABILITY <input type="checkbox"/> ANY AUTO <input type="checkbox"/> OWNED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS ONLY <input type="checkbox"/> NON-OWNED AUTOS ONLY						COMBINED SINGLE LIMIT (Ea accident) \$ BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ \$
	UMBRELLA LIAB <input type="checkbox"/> OCCUR EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DED <input type="checkbox"/> RETENTION \$						EACH OCCURRENCE \$ AGGREGATE \$ \$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	<input type="checkbox"/> Y <input type="checkbox"/> N	N/A				PER STATUTE <input type="checkbox"/> OTH-ER <input type="checkbox"/> E.L. EACH ACCIDENT \$ E.L. DISEASE - EA EMPLOYEE \$ E.L. DISEASE - POLICY LIMIT \$

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Indicate Agreement Reference Type: Provide **ONE** of the following: PO No., SSE ID, Requisition (REQ ID or Contract ID). For example, if you are providing a Purchase Order number, your answer should say "PO No." followed by the actual number.)

Indicate Agreement Name: For example - "Upgrade & Repair R160 Door Operators"

Indicate Agreement Type: Operating / Capital / NFB / Other (Please Specify one)

CERTIFICATE HOLDER**CANCELLATION****Agency / MTA**

c/o MTA Risk and Insurance
Management 2 Broadway, 21st Floor
New York, NY 10004

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE



NEW YORK CONSTRUCTION CERTIFICATE OF LIABILITY INSURANCE ADDENDUM

DATE (MM/DD/YYYY)

THIS ADDENDUM SUMMARIZES SOME OF THE POLICY PROVISIONS IN THE REFERENCED INSURANCE POLICIES AND IS ISSUED AS A MATTER OF INFORMATION ONLY; IT CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. ALL TERMS, EXCLUSIONS AND CONDITIONS IN THE ACTUAL POLICY SHOULD BE CONSULTED FOR A MORE DETAILED ANALYSIS OF COVERAGE, AS THIS ADDENDUM DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES.

AGENCY		NAMED INSURED(S)	
POLICY NUMBER	EFFECTIVE DATE	CARRIER	NAIC CODE

ADDENDUM INFORMATION**CERTIFICATE NUMBER:** _____**REVISION NUMBER:** _____**A. Insurer**

- ☒ Admitted / authorized
- ☒ Excess line or free trade zone

Either one is acceptable:

-Admitted/authorized: Minimum AM Best Rating of A- and FSC of VII
 -Excess: Above Best Rating AND be licensed/approved by NYS

B. General Liability (GL) policy form

- ☒ ISO / ISO modified
- ☐ Other

Other may be selected,
if so, declaration page
must be included.

Refer to RIM if any is checked.
If anything is checked, exclusion must
not apply to work involved in contract.

C. Specific operations excluded or restricted (GL policy)

- ☐ Location: _____
- ☐ Type of construction: _____
- ☐ Building height: _____
- ☐ Classifications [see attached declarations / endorsement]
- ☐ Designated work [see attached endorsement]

- CG 2010 with CG 2037 or equivalent
 - CG 2038 with CG 2037 or equivalent

D. Additional insured endorsement (GL policy)

- ☒ CG 20 10 ☐ CG 20 26 ☐ CG 20 32 ☐ CG 20 33 ☒ CG 20 37 ☒ CG 20 38
- ☐ Other: # _____ Title: _____

E. According to the terms of this GL policy, the additional insured has primary and noncontributory coverage

- ☒ Yes ☐ No and ☐ no other option is available with this insurer

F. Additional insured will receive advance notice if insurer cancels (GL policy)

- ☒ Yes ☐ No and ☐ no other option is available with this insurer

G. Blanket contractual liability located in the "insured contract" definition (Section V, Number 9, Item f. in the ISO CGL policy) is removed or restricted

- ☒ Yes and ☐ no other option is available with this insurer ☐ No changes made

Applicable to Railroads
only.

H. "Insured contract" exception to the employers liability exclusion is removed or modified (GL policy)

- ☒ Yes and ☐ no other option is available with this insurer ☐ No changes made

I. GL policy (including endorsements) does not cover the additional insured for claims involving injury to employees of the named insured or subcontractors (not workers' compensation)

- ☐ Yes and ☐ no other option is available with this insurer ☒ No changes made

J. Earth movement, excavation or explosion / collapse / underground property damage is excluded or restricted (GL policy)

☐ Yes and ☐ no other option is available with this insurer ☒ No changes made

K. Insured vs. insured suits (cross liability in the ISO CGL policy) are excluded or restricted (other than named insured vs. named insured)

☐ Yes and ☐ no other option is available with this insurer ☒ No changes made

L. Property damage to work performed by subcontractors (exception to the "damage to your work" exclusion in the ISO CGL policy) is excluded or restricted

☐ Yes and ☐ no other option is available with this insurer ☒ No changes made

M. Excess / umbrella policy is primary and non-contributory for additional insureds

☒ Yes, by specific policy provision ☒ Yes, by endorsement ☐ No and ☐ no other option is available with this insurer

Either one is acceptable

AUTHORIZED REPRESENTATIVE SIGNATURE

DATE (MM/DD/YYYY)



ADDITIONAL REMARKS SCHEDULE

Page ____ of ____

AGENCY		NAMED INSURED
POLICY NUMBER		
CARRIER	NAIC CODE	
		EFFECTIVE DATE:

ADDITIONAL REMARKS

THIS ADDITIONAL REMARKS FORM IS A SCHEDULE TO ACORD FORM,

FORM NUMBER: _____ FORM TITLE: _____

Indicate Additional Coverages per Insurance Schedule:

<u>Carrier Name</u>	<u>NAIC #</u>	<u>Coverage</u>	<u>Policy Eff Date</u>	<u>Policy Exp Date</u>	<u>Limits of Liability</u>
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Notes:

1. List additional Comments/Indemnities & demonstrate that you are compliant with required policy endorsements by enumerating them here. For example, contractor's policies provided to the additional Insureds is primary and non-contributory.
2. Please refer to this link - <http://www.mta.info/vendor-insurance> to copy the Indemnities for your contract.