ERIE COUNTY WATER AUTHORITY

INTEROFFICE MEMORANDUM

June 6, 2022

To: Terrence D. McCracken, Secretary to the Authority

From: Leonard F. Kowalski, Executive Engineer

Subject: Andrews Avenue Watermain Relocation
Town of Cheektowaga
Cooperative Agreement
ECWA Project No. 202200066

The Town of Cheektowaga (Town) requested the relocation of an existing direct service distribution main due to several leaks occurring during the initial phase of their East Delavan Avenue Pump Station Project, which includes the installation of a new sanitary trunk sewer installation adjacent to the existing waterline. The leaks resulted in unsafe working conditions within the trench limits for the sanitary trunk sewer. The Town project is currently on hold until the existing distribution main along Andrews Avenue is relocated.

To expedite the project and to keep the Town's project on schedule, the Authority Engineering Department and Town Engineer determined the best course of action would be to do a joint project. The joint project would utilize the Town's contractor who is already under contract install the new waterline.

The Authority Engineering Department designed the replacement/relocation of the existing main to improve the resiliency and efficiency of a portion of the water distribution system in a section of Andrews Avenue approximately between Schoedel Avenue and West Delavan Avenue as well as West Delavan Avenue between Marne Road and Preston Road by abandoning approximately 1,000 linear feet of obsolete cast iron 8-inch diameter waterline (installed in 1938) and installing a new ductile iron 8-inch waterline, interconnections and abandonments, hydrant replacement, and service transfers within the Project area ("Andrews Avenue Water System Improvements"),

The ECWA Engineering Department developed quantity take-offs and cost estimate, utilizing our Water Distribution System Replacements and Improvements May 1, 2021 to April 30, 2023 Contract (ECWA 202100009), and the Town's contractor provided an estimate, based off ECWA's quantity take-off, for the relocation of the existing distribution main. The Project would recognize an economy of scales if it was incorporated into the Town's existing contract (Savings: mobilization, bedding and backfill, restoration, and demobilization).

A Cooperative Agreement (Agreement) was developed by the Legal and Engineering Departments and presented to the Town. The Town's Attorney approved the Agreement and the Town Board will execute the Agreement following their June 14th Board meeting.

This Agreement is necessary to coordinate and facilitate the relocation of 1,000 linear feet of existing 8-inch cast iron waterline with new 8-inch ductile iron waterline and appurtenances on Andrews Avenue approximately between Schoedel Avenue and West Delavan Avenue as well as West Delavan Avenue between Marne Road and Preston Road. The Town will complete all phases of construction for the project retaining CMH Company Inc to complete the construction.

The Town agrees to complete and to pay for the final surface restoration of the Andrews Avenue Water System Improvement Project with the Authority, through the Contractor, agreeing to pay for all necessary temporary restoration during the construction phase.

The Town and the Authority have agreed that the Authority will pay for the construction of the Andrews Avenue Water System Improvement Project per the unit prices established in the Contractor's estimate, of the Agreement within Appendix A, excluding final restoration, so long as the cost of construction does not exceed $215,000.

The Agreement which has been approved by both the Authority's and Town's Legal Teams. Attached find three copies of the Agreement for review and approval by the Board. Once executed by the Town, the Contractor and the Authority Chairman one copy each must be returned to the Town and Contractor.

Please feel free to contact me if you have any questions.

Budget:

- Unit 2590 – Eng/Const Distribution Mains
    - Item 101188 Betterments

LFK:WWW:jmf
Attachments
cc: R.Stoll
M.Quinn
W.Wheeler
CHTN-027-2201-X-16

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

Contract: _____ **Project No.:** 202200066

Project Description: Cooperative Agreement, Andrews Avenue Watermain Relocation, Town of Cheektowaga

Item Description:

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

Action Requested:

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

Approvals Needed:

APPROVED AS TO CONTENT:

- [X] Sr Distribution Engineer _____ Date: 6/6/2022
- [X] Chief Operating Officer _____ Date: 6/6/2022
- [X] Executive Engineer _____ Date: 06/06/2022
- [X] Director of Administration _____ Date: 06/06/2022
- [X] Risk Manager _____ Date: 06/06/2022
- [X] Chief Financial Officer _____ Date: 06/06/2022
- [X] Legal _____ Date: 6/6/2022

APPROVED FOR BOARD RESOLUTION:

- [X] Secretary to the Authority _____ Date: 6/8/22

Remarks: _____

Resolution Date: _____ **Item No:** _____

COOPERATIVE AGREEMENT

This Cooperative Agreement ("Agreement"), effective as of ("Effective Date"), is by and among

ERIE COUNTY WATER AUTHORITY
295 Main Street, Room 350
Buffalo, New York 14203

hereinafter referred to as the "Authority" and

TOWN OF CHEEKTOWAGA
3301 Broadway Street
Cheektowaga, New York 14227

hereinafter referred to as the "Town" and

CMH COMPANY, INC.
12750 North Road
Alden, New York 14004

Hereinafter referred to as the "Contractor."

Recital

WHEREAS, the Town has initiated a capital improvement project, known as the East Delavan Avenue Pump Station, proposing a sanitary trunk sewer installation to remove the East Delavan Avenue Pump Station (the "Project"),

WHEREAS, the Town has accepted the bid and awarded a contract to the Contractor which began construction in 2021,

WHEREAS, the Town requested the relocation of an existing direct service distribution main due to several leaks occurring during the initial phase of the Project resulting in unsafe working conditions within the trench limits for the sanitary trunk sewer,

WHEREAS, the Authority utilized the Engineering Department to design the replacement/relocation of the existing main to improve the resiliency and efficiency of a portion of the water distribution system in a section of Andrews Avenue approximately between Schoedel Avenue and West Delavan Avenue as well as West Delavan Avenue between Marne Road and Preston Road by abandoning approximately 1,000 linear feet of obsolete cast iron 8-inch diameter waterline (installed in 1938) and installing a new ductile iron 8-inch waterline, interconnections and abandonments, hydrant replacement, and service transfers within the Project area ("Andrews Avenue Water System Improvements"),

WHEREAS, the Authority has provided the Town and Contractor with the initial design plans for the Andrews Avenue Water System Improvements,

WHEREAS, the Town and Contractor had no comments on the design provided by the Authority with the Contractor providing a construction estimate to the Authority,

WHEREAS, the Authority's Engineering Department has reviewed the construction estimate and found the estimate fair with no mathematical errors,

WHEREAS, by working in a cooperative fashion to replace/relocate the Andrews Avenue distribution main as part of the Town's Project, both the Town and Authority will save both time and money in the completion of both projects, and

NOW, THEREFORE, in consideration of the mutual promises set forth in this Agreement, the parties agree as follows:

ARTICLE 1
ANDREWS AVENUE WATER SYSTEM IMRPOVEMENT PROJECT

1.01 All of the recitals set forth above are hereby incorporated into the body of this Agreement as though separately and specifically set forth herein.

1.02 The installation of the Andrews Avenue Water System Improvement Project will be as shown and noted on the plans and technical specifications submitted and approved by the Town, Town's Contractor, and the New York State Department of Health on April 19, 2022, and sealed by the Authority's Executive Engineer on March 25, 2022, a copy of which will be attached to, and incorporated in, this Agreement as Appendix A.

1.03 In accordance with the approved plans and specifications, the parties agree the Authority will abandon approximately 1,000 linear feet of 8-inch cast iron waterline and install, through the Contractor, approximately 1,000 linear feet of new 8-inch diameter ductile iron pipe (DIP) on the eastern side of Andrews Avenue within the limits of the sidewalk from the south side of Schoedel Avenue intersection to the south side of the intersection with West Delavan Avenue and on the south side of West Delavan Avenue within the pavement limits from the west side intersection of Marne Road to the east intersection of Preston Road.

1.04 As part of the Andrews Avenue Water System Improvement Project, the Contractor will install nine (9) new valves, one (1) hydrant assembly, seventeen (17) water service connections, three (3) interconnections, two (2) abandonment, and other incidental installations necessary to place the new watermain in service.

1.05 The Town agrees to complete and to pay for the final surface restoration of the Andrews Avenue Water System Improvement Project with the Authority, through the Contractor, agreeing to pay for all necessary temporary restoration during the construction phase.

1.06 During construction, the Authority will perform resident inspection services and will immediately notify the Town, or his designated project engineer, of any unanticipated problems associated with the Andrews Avenue Water System Improvement Project.

ARTICLE 2
COSTS

2.01 The Town and the Authority have agreed that the Authority will pay for the construction of the Andrews Avenue Water System Improvement Project per the unit prices established in the Contractor's estimate, of this Agreement within Appendix A, excluding final restoration, so long as the cost of construction does not exceed $215,000.

2.02 The Town has agreed to pay for all costs associated with the final restoration, relating to the Andrews Avenue Water System Improvement Project, as part of the Project.

2.03 The parties agreed that the Authority will provide all materials detailed in Section 01100 – Summary of Work, Part 1.04, excluding final restoration materials, of this Agreement within Appendix A.

2.04 The parties agreed that the Contractor will provide all materials detailed in Section 01100 – Summary of Work, Part 1.05 of this Agreement within Appendix A, and all final restoration materials.

ARTICLE 3
ACCEPTANCE OF THE WATER SYSTEM BY THE AUTHORITY

3.01 The Contractor shall arrange for water samples and bacterial tests to be taken and tested by an approved laboratory. The results shall be submitted to the Authority for review and development of the Construction Compliance Form. The Authority will submit the Construction Compliance Form to the Erie County Health Department for approval, and if all tests are satisfactory, the County Health Department shall submit a Certificate of Acceptance to the Authority.

3.02 Authority personnel shall direct the operation of valves on existing water mains during the required leakage and pressure tests and the disinfection of the water mains and appurtenances.

A. If the mains and appurtenances should fail the pressure or leakage tests, the necessary corrective measures shall be taken, and the tests repeated until satisfactory results are obtained.

B. Upon completion of these tests, the mains shall be shut off and not placed into service until the County Health Department issues a Certificate of Acceptance, all legal and administrative requirements have been satisfied, and the work has been accepted by the Authority. The Authority will then turn on the mains, which have been accepted by the Authority, and service can begin.

3.03 Prior to the start of construction, the Contractor shall provide the Authority with the following:

A. Payment bond.

1. Prior to the construction, a payment bond in form satisfactory to the Authority and issued by a carrier satisfactory to the Authority in an amount of one hundred (100%) percent of the estimated construction cost of the water mains and appurtenances. A sample payment bond in a form acceptable to the Authority is attached and made a part of this Agreement as Appendix B,

2. The Contractor will provide said payment bond to insure all labor and materials supplied for the construction and installation of the water mains and appurtenances have been fully paid, ensuring the Authority accepts such water mains and appurtenances without liens or encumbrances.

3. Said bond shall cover a period of twelve (12) months following completion of the installation of water mains and appurtenances.

4. The completion date shall be established as the date of acceptance of the work by resolution of the Authority.

3.04 Within four (4) weeks of the date the Erie County Health Department Certificate of Acceptance is received, and prior to both acceptance by the Authority and the date water service is begun, the Town and the Contractor shall provide the Authority with the following:

A. Performance bond.

1. A performance bond in form satisfactory to the Authority and issued by a carrier satisfactory to the Authority in an amount of one hundred (100%) percent of the actual construction cost of the water mains and appurtenances. A sample maintenance bond in a form acceptable to the Authority is attached and made a part of this Agreement as Appendix C.

2. Said bond shall cover a period of twenty-four (24) months following the completion of the installation of water mains and appurtenances. During this 24-month period, the Contractor agrees to maintain and repair the water mains and appurtenances accepted by the resolution of the Authority.

3. The completion date shall be established as the date of the acceptance of the work by resolution of the Authority.

4. If the Contractor defaults on its obligation, the Authority may seek to recover the cost of maintenance and repair from the carrier/surety of the

maintenance bond.

B. The Authority may review and verify the actual construction cost of the mains and appurtenances. The actual cost will be used to determine the amount of the performance and payment bonds mentioned above, and for all other legal and administrative purposes. The actual cost shall include the furnishing and installing of the pipe, valves, hydrants, paving and other appurtenances required to be completed before the work is accepted by resolution of the Authority.

C. A statement, signed and sealed by the Contractor, that all work involved in the installation of water mains and appurtenances was completed in accordance with plans and drawings approved by the Authority and in accordance with the Authority's specifications, that all valves, hydrants, and appurtenances are in satisfactory operating condition.

3.04 No hydrant shall be used for any purpose other than the extinguishing of fires, periodic tests of the fire protection system, or periodic drills by legally constituted fire companies, unless written authorization is given by the Authority. The Authority shall be notified in advance of the time of all tests and drills, so that if desired, the Authority may have a representative present.

3.05 At the completion of all the work, labor and service as well as installation of all materials and after all the conditions hereinabove set forth are complied with to the satisfaction of the Authority, the Authority agrees to accept said water mains, hydrants, services, and other appurtenances.

3.06 Title to all water mains, hydrants, services, and appurtenances shall vest in the Authority and the Authority shall provide service to the Town in the same manner as if the mains were originally installed by the Authority.

3.07 The Authority reserves the right at any time, without notice to shut off the water in its mains to make repairs, extensions or for other purposes, and it is expressly agreed that the Authority shall not be liable for deficiency or failure in the supply of water, water pressure or for any damage caused thereby or by the bursting or breaking of any main or service pipe or any attachment to the Authority’s property, other than through the gross negligence of the Authority. In the interest of public health, the Authority will not permit its mains or services to be connected with any service pipe or piping which is connected with any other source of water supply not approved by the Department of Health of the State of New York.

3.08 It is mutually understood and agreed:

A. The mains laid or to be laid pursuant to this Agreement shall be and remain the property of the Authority, its successors and assigns, and the Authority retains and shall have the right to extend any mains installed by it pursuant to the terms of the Agreement in or to other lands, streets, or avenues, but the Town shall not by reason thereof be entitled to any repayment.

B. Any authorized representative of the Authority shall have free access to the premises of the Town at any reasonable time for the purpose of inspecting said construction.

C. Water Service may be disconnected for the reasons enumerated in Section 2.32 of the Authority's Tariff.

ARTICLE 4
GENERAL PROVISIONS

4.01 ***Independent Status***: Nothing contained in the agreement shall be constructed to render either the Authority or the Town, employee, or agent of the other, nor shall either party have authority to bind the other in any matter, other than set forth in this agreement. It is intended that each party shall remain independent and separate from the other, and fully responsible for its own actions.

4.02 ***Insurance***:

A. The Contractor for the Andrews Avenue Water System Improvements agrees to secure and maintain such insurance necessary to protect itself, the Town, and the Authority, from claims under the Workmen's Compensation Act; claims for damages because of bodily injury, including personal injury, sickness or disease, or death of any of its employees or any person other than its employees; and from claims of damages because of injury to or destruction of property including loss of use resulting thereof in the amount indicated on Appendix D.

B. The Contractor agrees to provide and maintain insurance that will provide coverage for claims arising out of the negligent performance of its services.

C. The Contractor agrees to provide Certificates of Insurance certifying the coverage required by this provision.

D. The Contractor agrees to provide the name of an employee who will be responsible for providing the Authority with current and updated Certificates of Insurance. The Authority will require the name of the employee, the employee's phone number and email addresses.

E. The Contractor agrees to require all direct or indirect subcontractors to procure and maintain insurance in accordance with the Insurance Requirements, as set forth in the Addendum Agreement, attached as Appendix E.

4.03 ***Indemnification***

A. To the fullest extent permitted by law, the Town agrees to indemnify and hold the Authority harmless from all third party claims, liabilities, damages and costs (including all reasonable attorney's fees, and cost of defense) to which the Authority, its officers, directors, employees and agents may be subject to, arising

out of the death or bodily injury to any person or the destruction or damage to any property to the extent caused by the negligent acts, errors or omissions, or willful misconduct of the Town, its officers, directors, employees and agents under this Agreement and those of its contractors or subcontractors or anyone for whom the Town is legally liable.

B. To the fullest extent permitted by law, the Contractor agrees to indemnify and hold the Authority harmless from all third party claims, liabilities, damages and costs (including all reasonable attorney's fees, and cost of defense) to which the Authority, its officers, directors, employees and agents may be subject to, arising out of the death or bodily injury to any person or the destruction or damage to any property to the extent caused by the negligent acts, errors or omissions, or willful misconduct of the Contractor, its officers, directors, employees and agents under this Agreement and those of its subcontractors or anyone for whom the Contractor is legally liable.

C. To the fullest extent permitted by law, the Authority agrees to indemnify and hold the Town and/or the Contractor harmless from all third-party claims, liabilities, damages, and costs (including all reasonable attorney's fees and cost of defense) to the extent caused by the negligent acts, errors or omissions of the Authority, its contractors, engineers, or anyone for whom the Authority is legally liable.

4.04 ***Amendments and Modifications***: No modification, amendment or changes in the Pac Way Water Main Project shall be valid unless the Authority is given prior written notice by the Town and/or the Contractor and the Authority gives the Town and the Contractor prior written approval of same.

4.05 ***Notice***: Any notices required by this Agreement or otherwise shall be delivered by United States Postal mail or personal delivery upon the addresses stated above. Any change in such addresses shall be required to be in writing to the other party and acknowledged as such.

4.06 ***Entire Agreement***: This Agreement contains the entire Agreement between the parties relating to its subject matter. All prior or contemporaneous contracts, understandings and statements are merged herein.

4.07 ***Approval***: This Agreement is subject to approval by the respective parties in accordance with the authority granted to each party.

IN WITNESS WHEREOF, the parties hereto have set their hands and seals as of the Effective Date.

TOWN OF CHEEKTOWAGA	**ERIE COUNTY WATER AUTHORITY**
DIANE BENCZKOWSKI, Supervisor	JEROME D. SCHAD, Chair

CMH COMPANY, INC.

MARK METZ, President

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

On the ___ day of June, in the year 2022, before me personally came DIANE BENCZKOWSKI, to me known, who being by me duly sworn did depose and say that she resides in Cheektowaga, New York, that she is the Supervisor of the TOWN OF CHEEKTOWAGA, described in the above instrument, and she signed her name thereto by the authorization of the Town Board of the Town of Cheektowaga pursuant to a duly enacted resolution.

_____
Notary Public - State of New York

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

On the ___ day of June, in the year 2022, before me personally came MARK METZ, to me known, who being by me duly sworn, did depose and say that he resides in Alden, New York; that he is President of CMH COMPANY, INC., the corporation described in, and which executed, the foregoing instrument; that she knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation and that he signed his name thereto by like order.

_____
Notary Public - State of New York

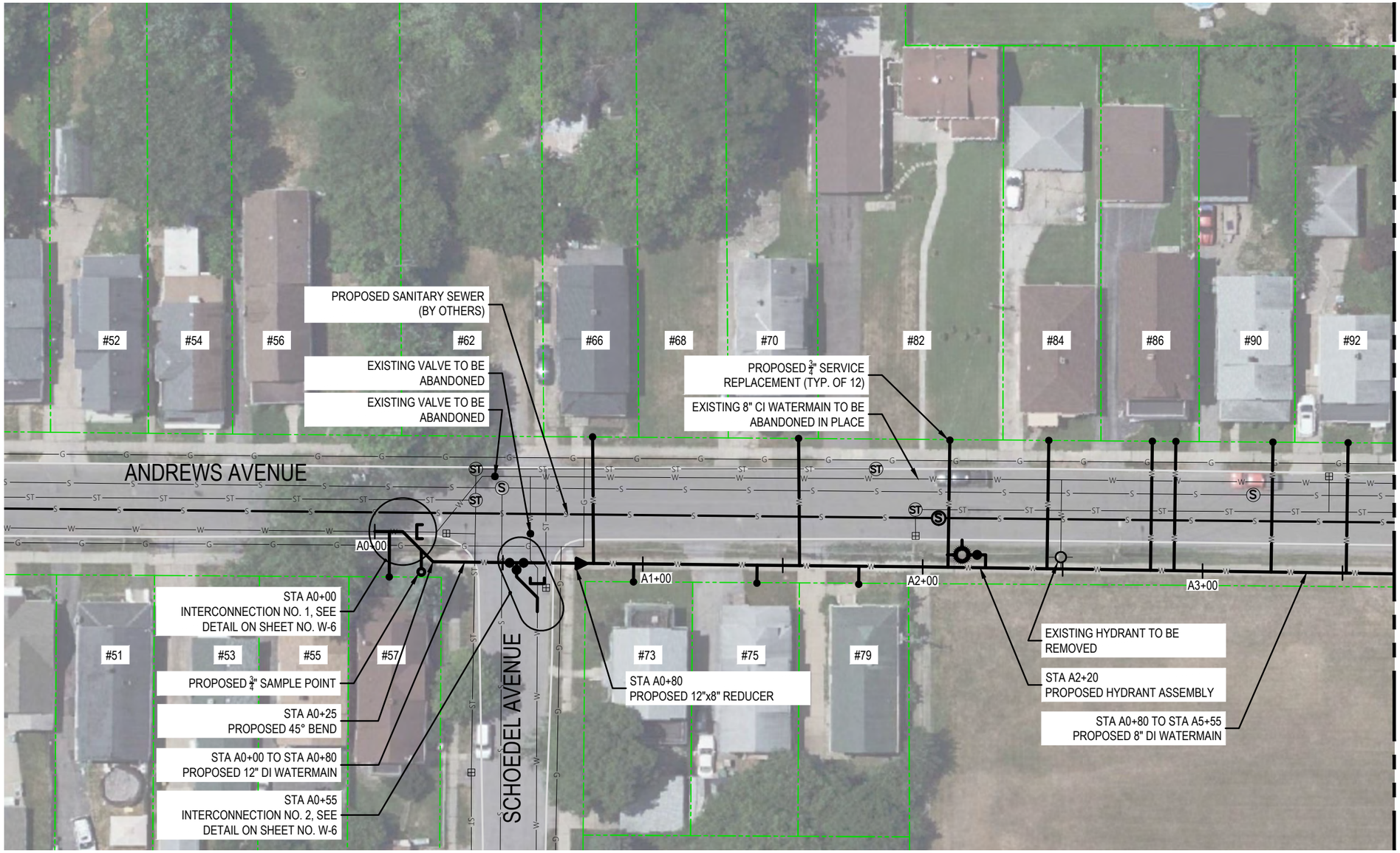
STATE OF NEW YORK)
) ss:
COUNTY OF ERIE)

On this ___ day of June, 2022, before me personally came JEROME D. SCHAD, to me known, who being by me duly sworn did depose and say that he resides in Amherst, New York, that he is the Chairman of the ERIE COUNTY WATER AUTHORITY, the corporation named in the foregoing indenture; that he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by a duly adopted resolution of the said Authority and that he signed his name thereto by like resolution.

_____
Notary Public - State of New York

APPENDIX A

APPROVED PLANS



General Notes

1.) ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ERIE COUNTY WATER AUTHORITY STANDARD DETAILS AND SPECIFICATIONS, ECWA PN: 202100009

2.) WATERMAINS SHALL BE PRESSURE TESTED IN ACCORDANCE WITH AWWA C600

3.) WATERMAINS SHALL BE TESTED AND DISINFECTED IN ACCORDANCE WITH AWWA STANDARD C651, HOWEVER THE TABLET METHOD IS NOT ALLOWED

4.) TWO SETS OF WATER BACTERIOLOGICAL SAMPLES SHALL BE TAKEN AT LEAST 24 HOURS APART

5.) SEE STANDARD DETAIL GENERAL NOTES SECTION ON MISCELLANEOUS DETAILS

6.) CONTRACTOR TO PROVIDE MAINTENANCE AND PROTECTION OF TRAFFIC THROUGHOUT CONSTRUCTION

7.) SERVICE LOCATIONS ARE APPROXIMATIONS ONLY AND SHOULD BE FIELD CHECKED PRIOR TO CONSTRUCTION

Legend

- (S) = SANITARY MH
- (T) = TRAFFIC MH
- (ST) = STORM MH
- = CATCH BASIN
- = UTILITY POLE
- = FIRE HYDRANT
- = WATER VALVE
- = TREES
- W = EXISTING WATERLINE
- W = NEW WATERLINE
- S = SANITARY SEWER
- ST = STORM SEWER
- G = GAS MAIN

SCALE: 1" = 40'-0"

0 20 40 80

GRAPHIC SCALE (IN FEET)

Dig Safely. New York Call 811 before you dig

ALL UTILITIES ARE BASED ON BEST GIVEN INFORMATION AND ARE APPROXIMATE ONLY. SOME UTILITIES MAY NOT BE SHOWN. CONTRACTOR SHALL FIELD VERIFY ALL UTILITIES DURING EXCAVATION BY CONTACTING UFPO PRIOR TO PERFORMING ANY EARTHWORK.

Approved By:

STATE OF NEW YORK
LEONARD F. KOWALSKI
084003
LICENSED PROFESSIONAL ENGINEER

ERIE COUNTY WATER AUTHORITY
3030 UNION RD.
CHEEKTOWAGA NY, 14227

Project Name

ANDREWS AVENUE
WATERMAIN RELOCATION
ECWA PN202200066

TOWN OF CHEEKTOWAGA
ERIE COUNTY - NEW YORK

Name: ANDREWS AVE PLAN

Date: MARCH 2022

Scale: AS SHOWN

Drawn/Revised By: WWW

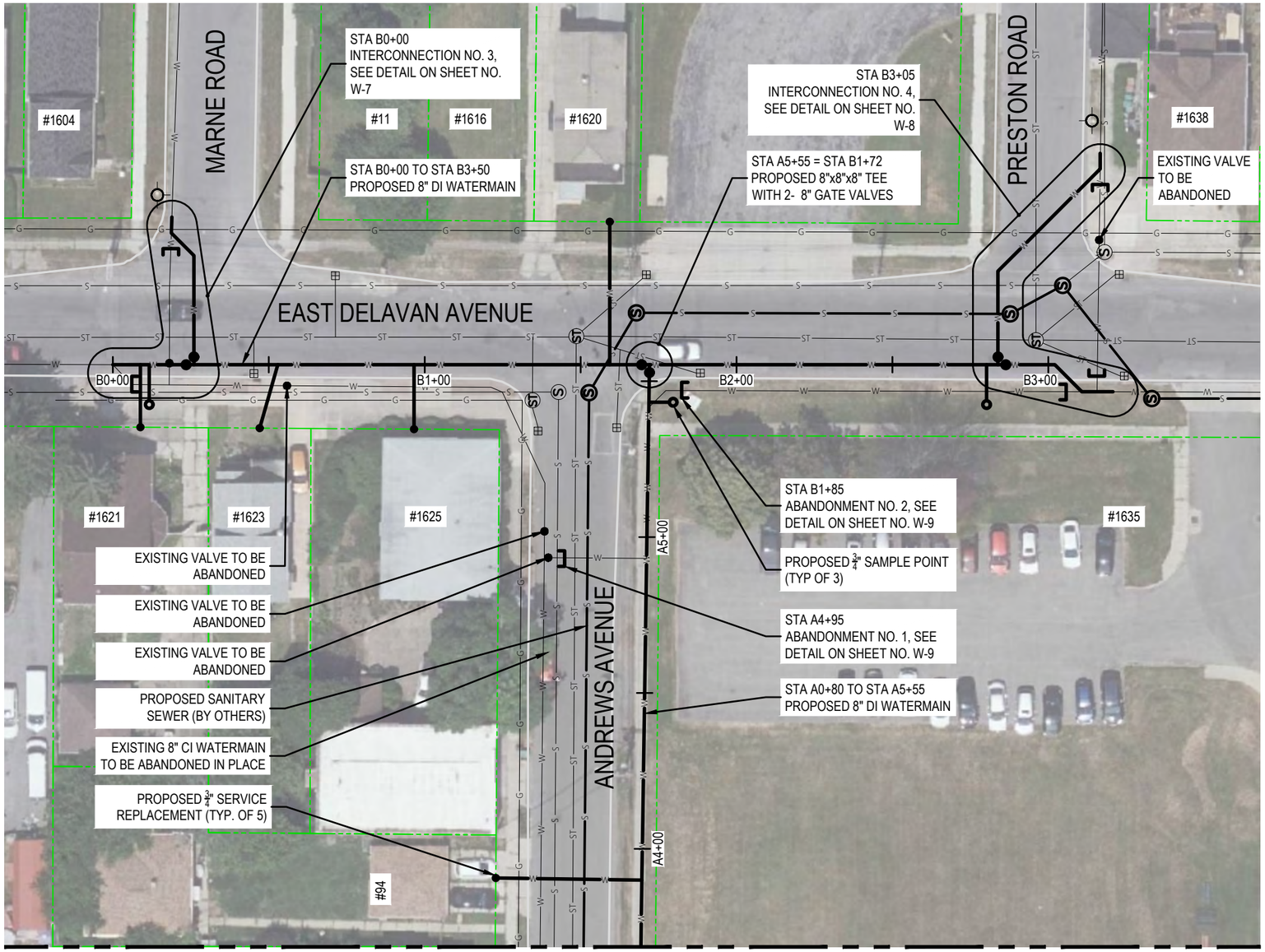
Sheet

W-1

Page: 1 of 21

File Name: 202200066 - ANDREWS DESIGN

NOTE: NORTH HAS BEEN ROTATE 90° FROM PREVIOUS PLAN SHEET



MATCH LINE SEE SHEET W-1

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Approved By:

STATE OF NEW YORK · LEONARD F. KOWALSKI · 084003 · LICENSED PROFESSIONAL ENGINEER

ERIE COUNTY WATER AUTHORITY
3030 UNION RD.
CHEEKTOWAGA NY, 14227

Project Name

ANDREWS DELAVAN AVENUE
WATERMAIN RELOCATION
ECWA PN202200066

TOWN OF CHEEKTOWAGA
ERIE COUNTY - NEW YORK

Name: ANDREWS AND EAST DELAVAN AVE PLAN

Date: MARCH 2022

Scale: AS SHOWN

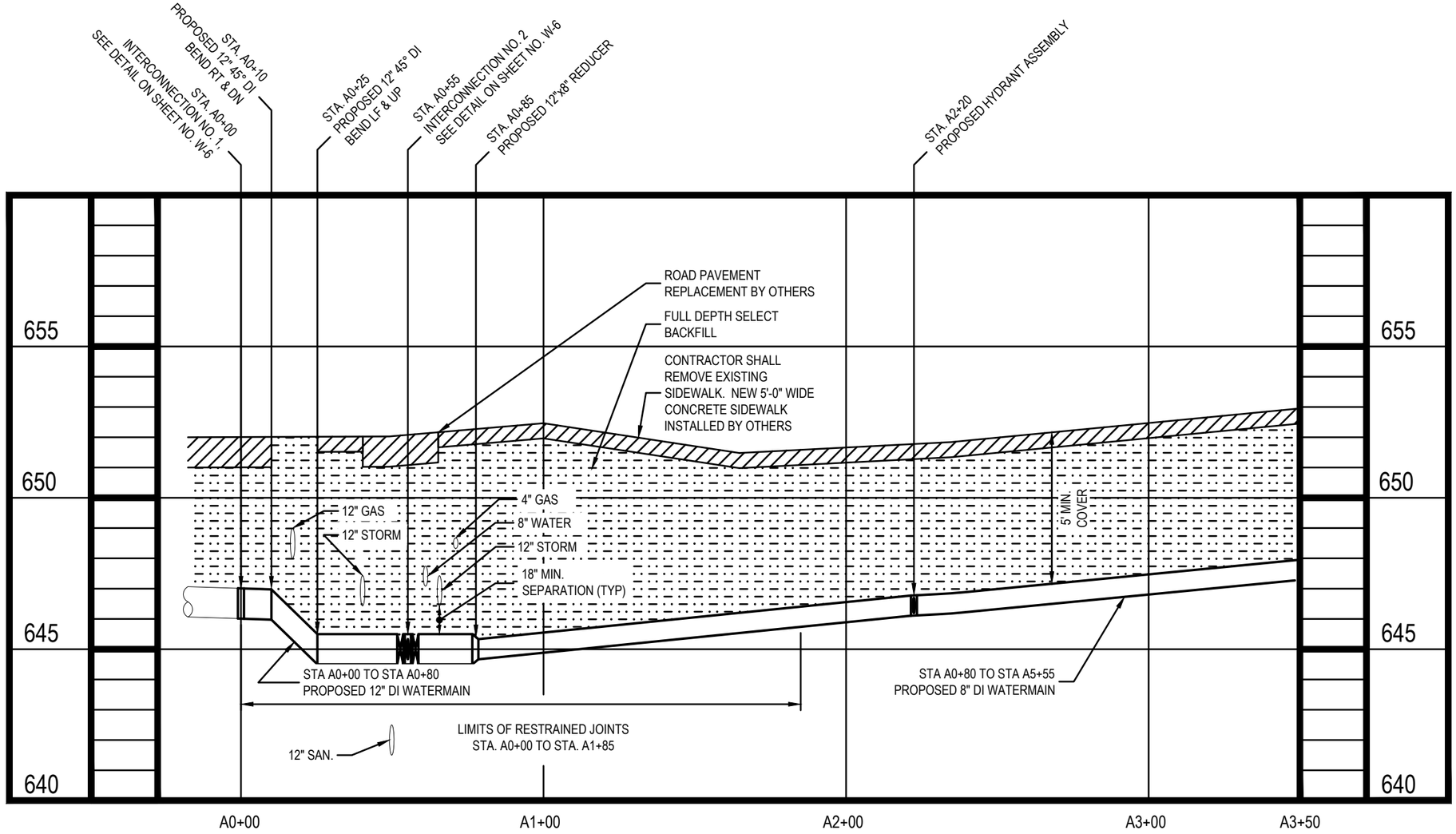
Drawn/Revised By: WWW

Sheet

W-2

Page: 2 of 21

File Name: 202200066 - ANDREWS DESIGN



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SCALE: HORZ. 1" = 40'-0"; VERT. 1" = 5'-0"

0 | H. 20 V. 2.5 | H. 40 V. 5 | H. 80 V. 10

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Approved By:

STATE OF NEW YORK · LEONARD F. KOWALSKI · 084003 · LICENSED PROFESSIONAL ENGINEER

ERIE COUNTY WATER AUTHORITY
3030 UNION RD.
CHEEKTOWAGA NY, 14227

Project Name

ANDREWS AVENUE
WATERMAIN RELOCATION
ECWA PN202200066

TOWN OF CHEEKTOWAGA
ERIE COUNTY - NEW YORK

Name: ANDREWS AVE PROFILE STA. A0+00 TO STA. A3+50

Date: MARCH 2022

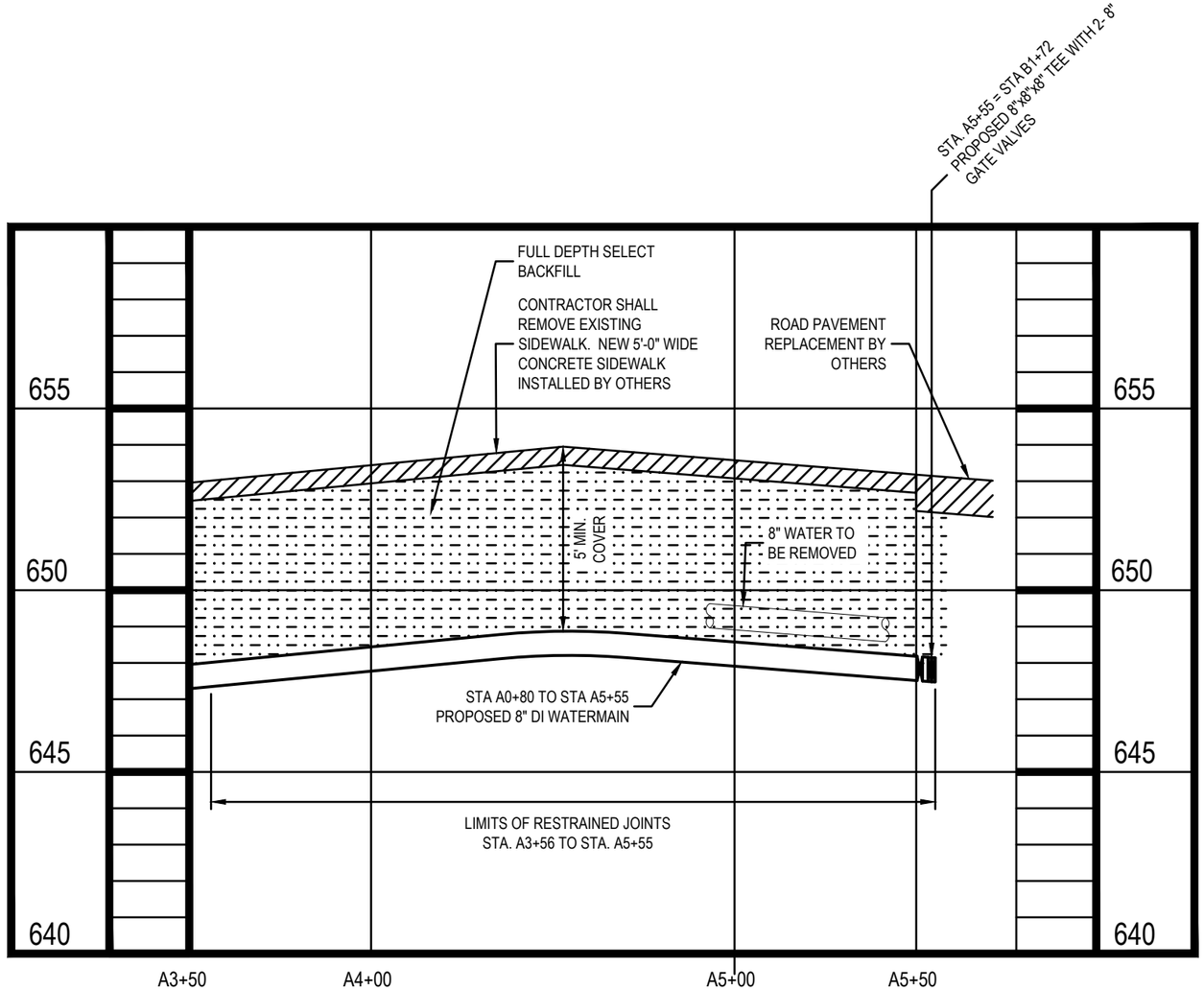
Scale: AS SHOWN

Drawn/Revised By: WWW

Sheet: W-3

Page: 3 of 21

File Name: 202200066 - ANDREWS DESIGN



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6.) CONTRACTOR TO PROVIDE MAINTENANCE AND PROTECTION OF TRAFFIC THROUGHOUT CONSTRUCTION

7.) SERVICE LOCATIONS ARE APPROXIMATIONS ONLY AND SHOULD BE FIELD CHECKED PRIOR TO CONSTRUCTION

Legend

- (S) = SANITARY MH
- (T) = TRAFFIC MH
- (ST) = STORM MH
- = CATCH BASIN
- = UTILITY POLE
- = FIRE HYDRANT
- = WATER VALVE
- = TREES
- W = EXISTING WATERLINE
- W = NEW WATERLINE
- S = SANITARY SEWER
- ST = STORM SEWER
- G = GAS MAIN

SCALE: HORZ. 1" = 40'-0"; VERT. 1" = 5'-0"

0 H. 20 V. 2.5 H. 40 V. 5 H. 80 V. 10

GRAPHIC SCALE (IN FEET)

Dig Safely. New York Call 811 before you dig

ALL UTILITIES ARE BASED ON BEST GIVEN INFORMATION AND ARE APPROXIMATE ONLY. SOME UTILITIES MAY NOT BE SHOWN. CONTRACTOR SHALL FIELD VERIFY ALL UTILITIES DURING EXCAVATION BY CONTACTING UFPO PRIOR TO PERFORMING ANY EARTHWORK.

Approved By:

STATE OF NEW YORK
LEONARD F. KOWALSKI
084003
LICENSED PROFESSIONAL ENGINEER

ERIE COUNTY WATER AUTHORITY
3030 UNION RD.
CHEEKTOWAGA NY, 14227

Project Name

ANDREWS AVENUE
WATERMAIN RELOCATION
ECWA PN202200066

TOWN OF CHEEKTOWAGA
ERIE COUNTY - NEW YORK

Name: ANDREWS AVE PROFILE STA. A3+50 TO STA. A5+55

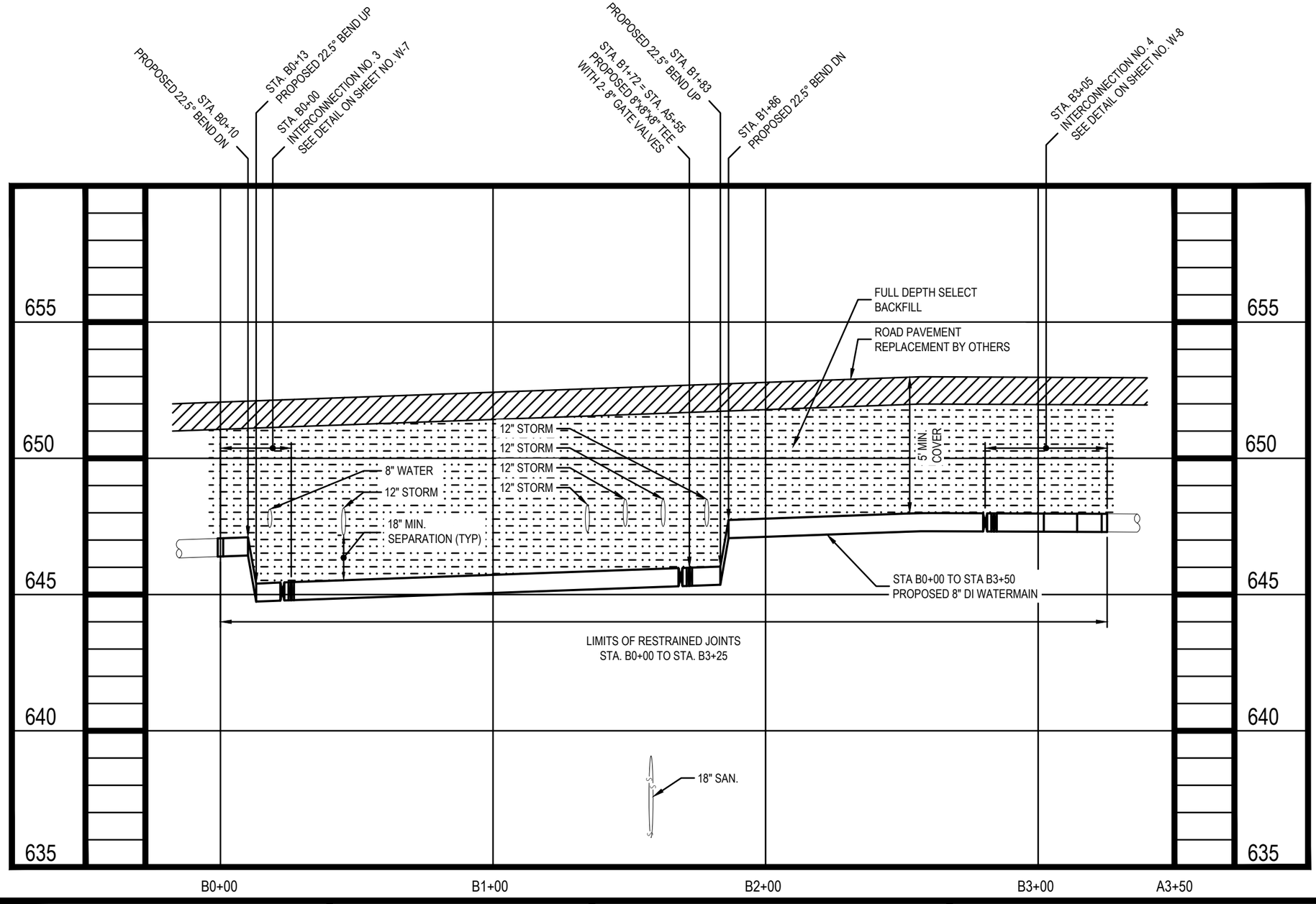
Date: MARCH 2022

Scale: AS SHOWN

Drawn/Revised By: WWW

Sheet: W-4

File Name: 202200066 - ANDREWS DESIGN



General Notes

1.) ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ERIE COUNTY WATER AUTHORITY STANDARD DETAILS AND SPECIFICATIONS, ECWA PN: 202100009

2.) WATERMAINS SHALL BE PRESSURE TESTED IN ACCORDANCE WITH AWWA C600

3.) WATERMAINS SHALL BE TESTED AND DISINFECTED IN ACCORDANCE WITH AWWA STANDARD C651, HOWEVER THE TABLET METHOD IS NOT ALLOWED

4.) TWO SETS OF WATER BACTERIOLOGICAL SAMPLES SHALL BE TAKEN AT LEAST 24 HOURS APART

5.) SEE STANDARD DETAIL GENERAL NOTES SECTION ON MISCELLANEOUS DETAILS

6.) CONTRACTOR TO PROVIDE MAINTENANCE AND PROTECTION OF TRAFFIC THROUGHOUT CONSTRUCTION

7.) SERVICE LOCATIONS ARE APPROXIMATIONS ONLY AND SHOULD BE FIELD CHECKED PRIOR TO CONSTRUCTION

Legend

- (S) = SANITARY MH
- (T) = TRAFFIC MH
- (ST) = STORM MH
- = CATCH BASIN
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- = WATER VALVE
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- W = EXISTING WATERLINE
- W = NEW WATERLINE
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- G = GAS MAIN

SCALE: HORZ. 1" = 40'-0"; VERT. 1" = 5'-0"

0 | H. 20 V. 2.5 | H. 40 V. 5 | H. 80 V. 10

GRAPHIC SCALE (IN FEET)

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Approved By:

STATE OF NEW YORK
LEONARD F. KOWALSKI
084003
LICENSED PROFESSIONAL ENGINEER

ERIE COUNTY WATER AUTHORITY
3030 UNION RD.
CHEEKTOWAGA NY, 14227

Project Name

ANDREWS AVENUE
WATERMAIN RELOCATION
ECWA PN202200066

TOWN OF CHEEKTOWAGA
ERIE COUNTY - NEW YORK

Name: DELAVAN AVE PROFILE STA. B0+00 TO STA. B3+25

Date: MARCH 2022

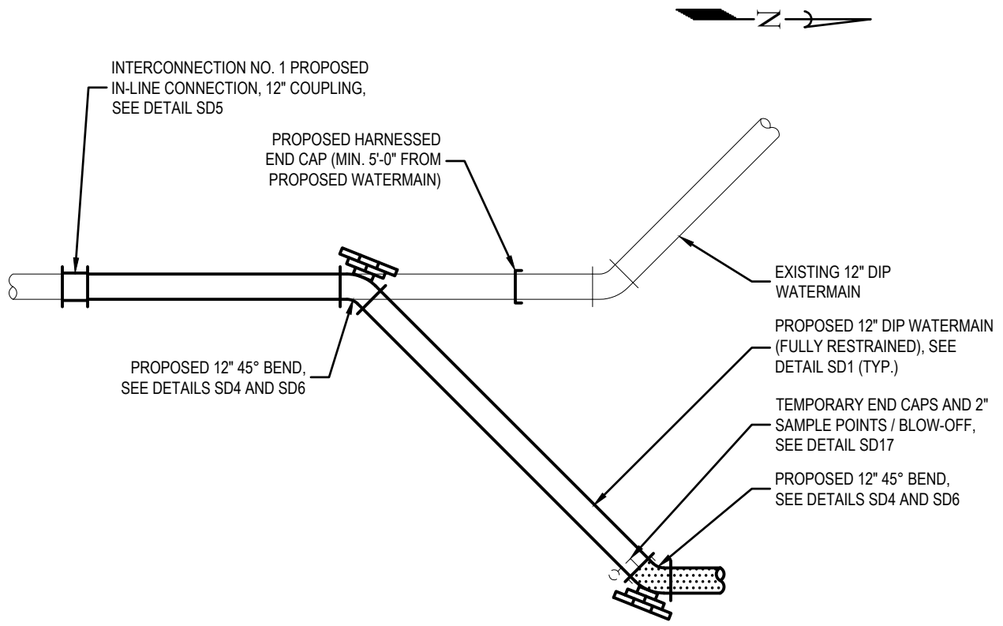
Scale: AS SHOWN

Drawn/Revised By: WWW

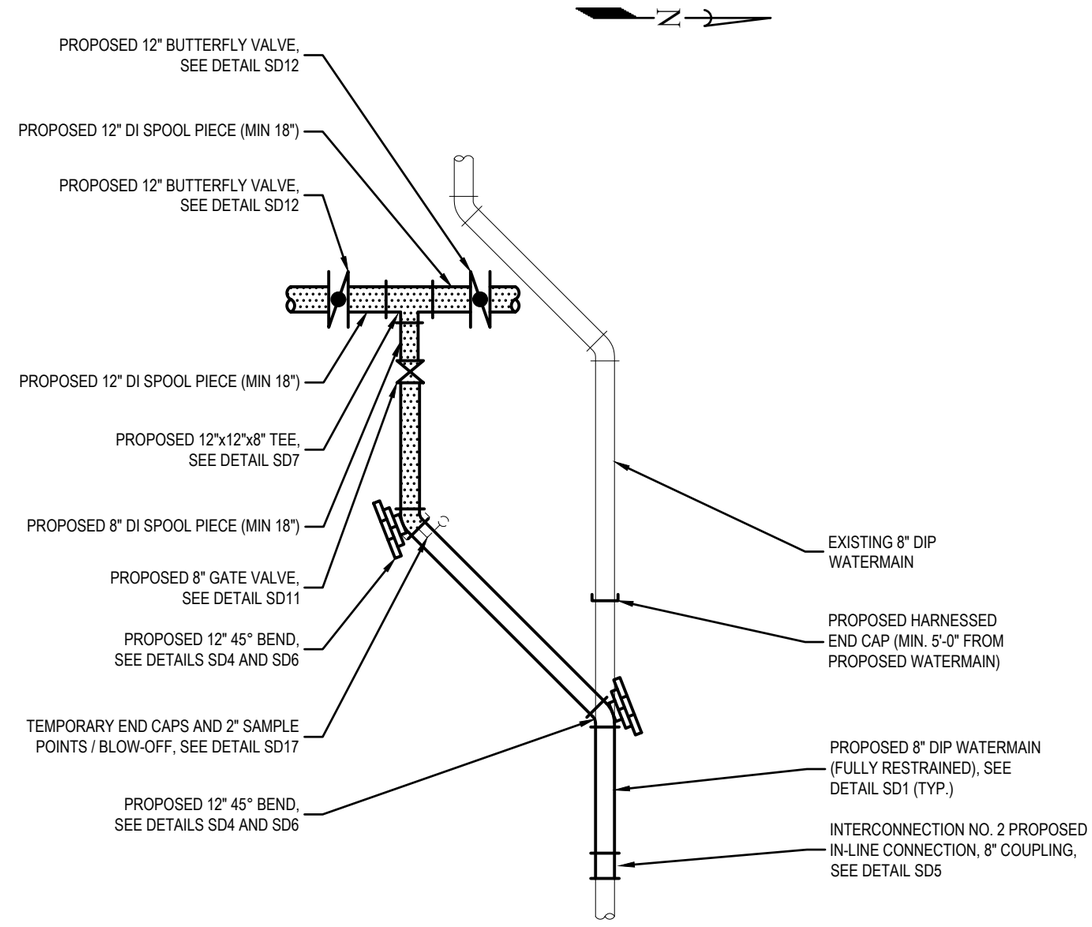
Sheet W-5

Page: 5 of 21

File Name: 202200066 - ANDREWS DESIGN



INTERCONNECTION NO. 1



INTERCONNECTION NO. 2

PRESSURE TEST AND DISINFECTION LIMITS

SCALE: 1" = 6'-0"

0 3 6 12

GRAPHIC SCALE (IN FEET)

Dig Safely. New York Call 811 before you dig

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Approved By:

STATE OF NEW YORK
LEONARD F. KOWALSKI
084003
LICENSED PROFESSIONAL ENGINEER

ERIE COUNTY WATER AUTHORITY
3030 UNION RD.
CHEEKTOWAGA NY, 14227

Project Name

ANDREWS AVENUE
WATERMAIN RELOCATION
ECWA PN202200066

TOWN OF CHEEKTOWAGA
ERIE COUNTY - NEW YORK

Name: INTERCONNECTIONS NO. 1 AND NO. 2

Date: MARCH 2022

Scale: AS SHOWN

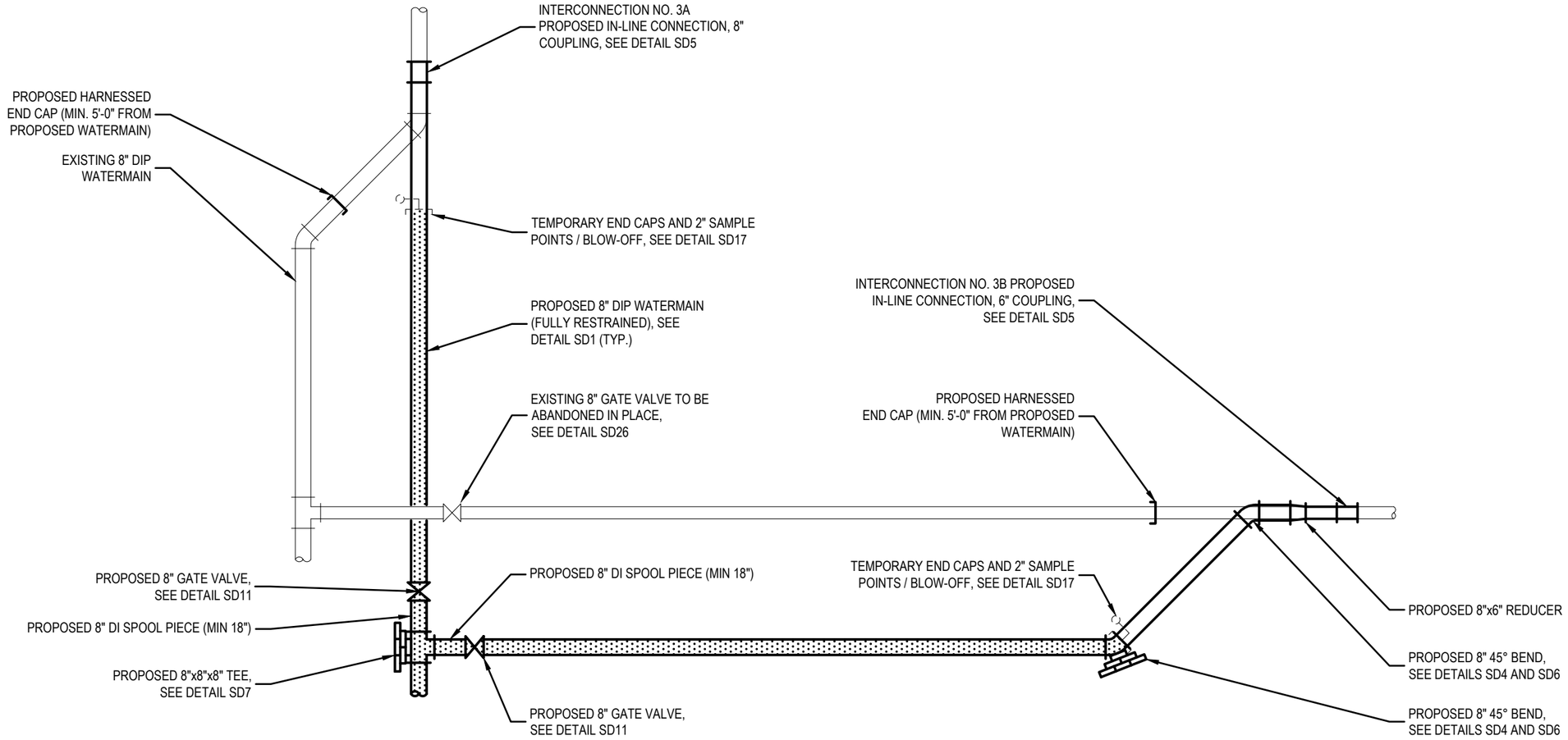
Drawn/Revised By: WWW

Sheet W-6

Page: 6 of 21

File Name: 202200066 - ANDREWS DESIGN

NOTE: NORTH HAS BEEN ROTATE 90° FROM PLAN VIEW



INTERCONNECTION NO. 3

PRESSURE TEST AND DISINFECTION LIMITS

SCALE: 1" = 6'-0"

0 3 6 12

GRAPHIC SCALE (IN FEET)

Dig Safely. New York Call 811 before you dig

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Approved By:

STATE OF NEW YORK · LEONARD F. KOWALSKI · 084003 · LICENSED PROFESSIONAL ENGINEER

ERIE COUNTY WATER AUTHORITY
3030 UNION RD.
CHEEKTOWAGA NY, 14227

Project Name

ANDREWS AVENUE
WATERMAIN RELOCATION
ECWA PN202200066

TOWN OF CHEEKTOWAGA
ERIE COUNTY - NEW YORK

Name: INTERCONNECTION NO. 3

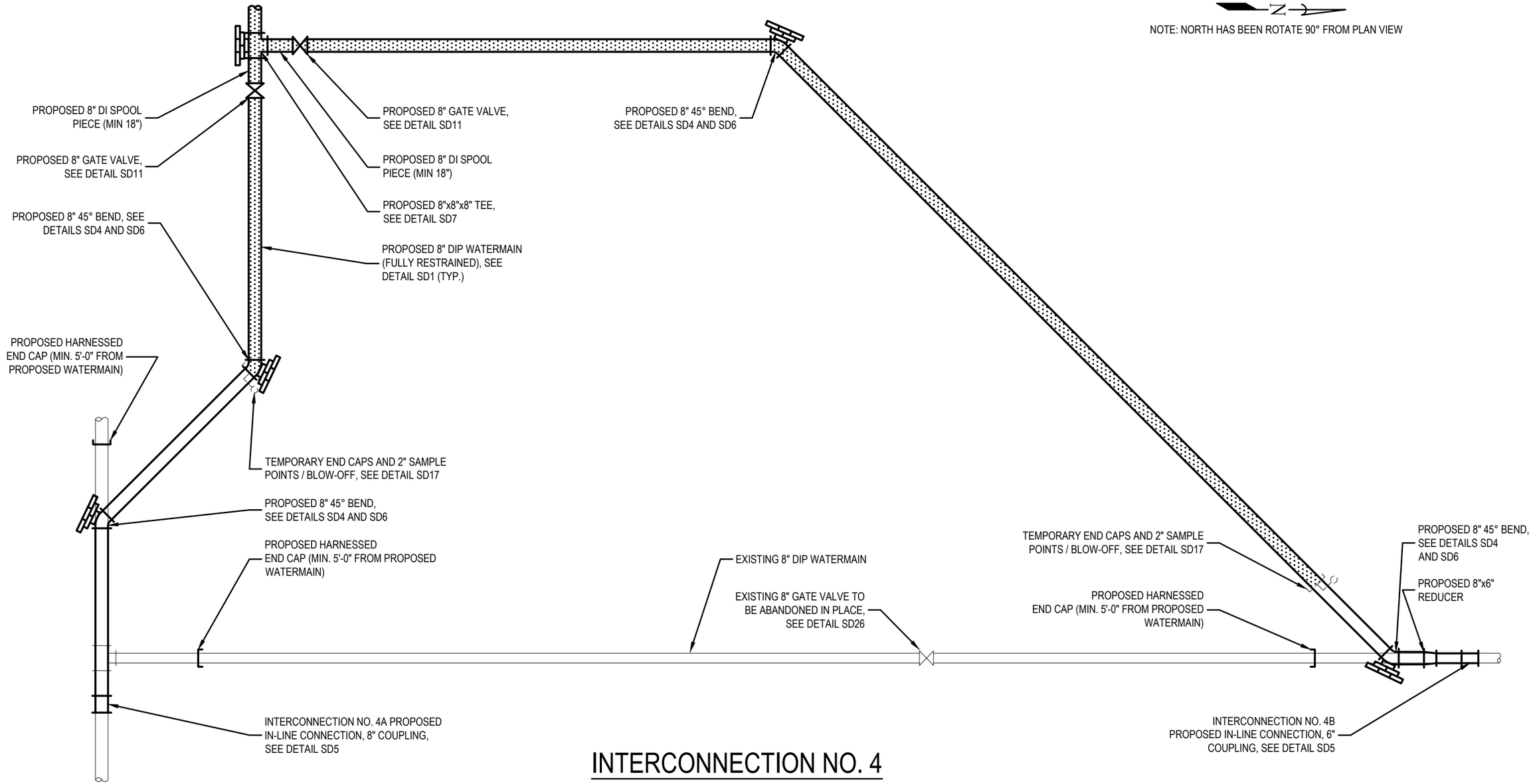
Date: MARCH 2022

Scale: AS SHOWN

Drawn/Revised By: WWW

Sheet W-7

File Name: 202200066 - ANDREWS DESIGN



INTERCONNECTION NO. 4

PRESSURE TEST AND DISINFECTION LIMITS

SCALE: 1" = 6'-0"

0 3 6 12

GRAPHIC SCALE (IN FEET)

Dig Safely. New York Call 811 before you dig

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Approved By:

STATE OF NEW YORK · LEONARD F. KOWALSKI · 084003 · LICENSED PROFESSIONAL ENGINEER

ERIE COUNTY WATER AUTHORITY
3030 UNION RD.
CHEEKTOWAGA NY, 14227

Project Name

ANDREWS AVENUE
WATERMAIN RELOCATION
ECWA PN202200066

TOWN OF CHEEKTOWAGA
ERIE COUNTY - NEW YORK

Name: INTERCONNECTION NO. 4

Date: MARCH 2022

Scale: AS SHOWN

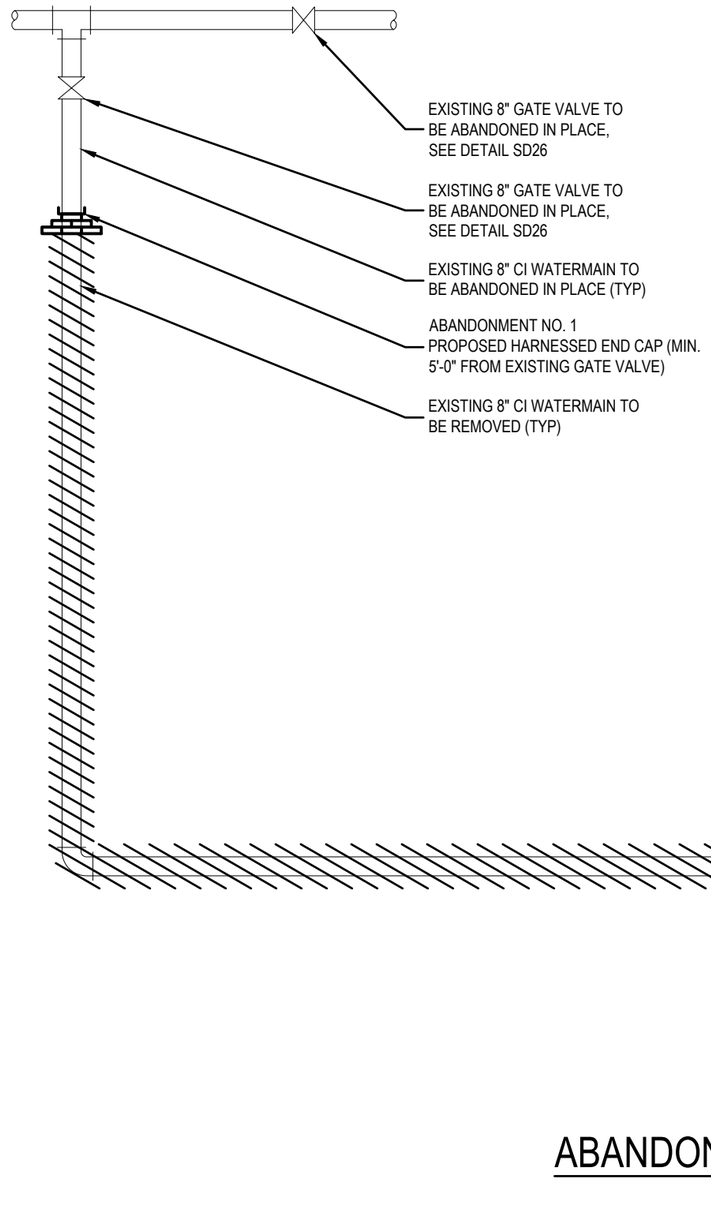
Drawn/Revised By: WWW

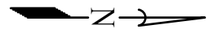
Sheet

W-8

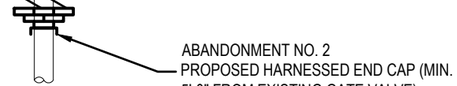
Page: 8 of 21

File Name: 202200066 - ANDREWS DESIGN





NOTE: NORTH HAS BEEN ROTATE 90° FROM PLAN VIEW



ABANDONMENT NO. 1 AND 2

PRESSURE TEST AND DISINFECTION LIMITS

SCALE: 1" = 6'-0"

0 3 6 12

GRAPHIC SCALE (IN FEET)

Dig Safely. New York Call 811 before you dig

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Approved By:

STATE OF NEW YORK ★ LEONARD F. KOWALSKI ★ 084003 ★ LICENSED PROFESSIONAL ENGINEER

ERIE COUNTY WATER AUTHORITY
3030 UNION RD.
CHEEKTOWAGA NY, 14227

Project Name

ANDREWS AVENUE
WATERMAIN RELOCATION
ECWA PN202200066

TOWN OF CHEEKTOWAGA
ERIE COUNTY - NEW YORK

Name: ABANDONMENT NO. 1 AND 2

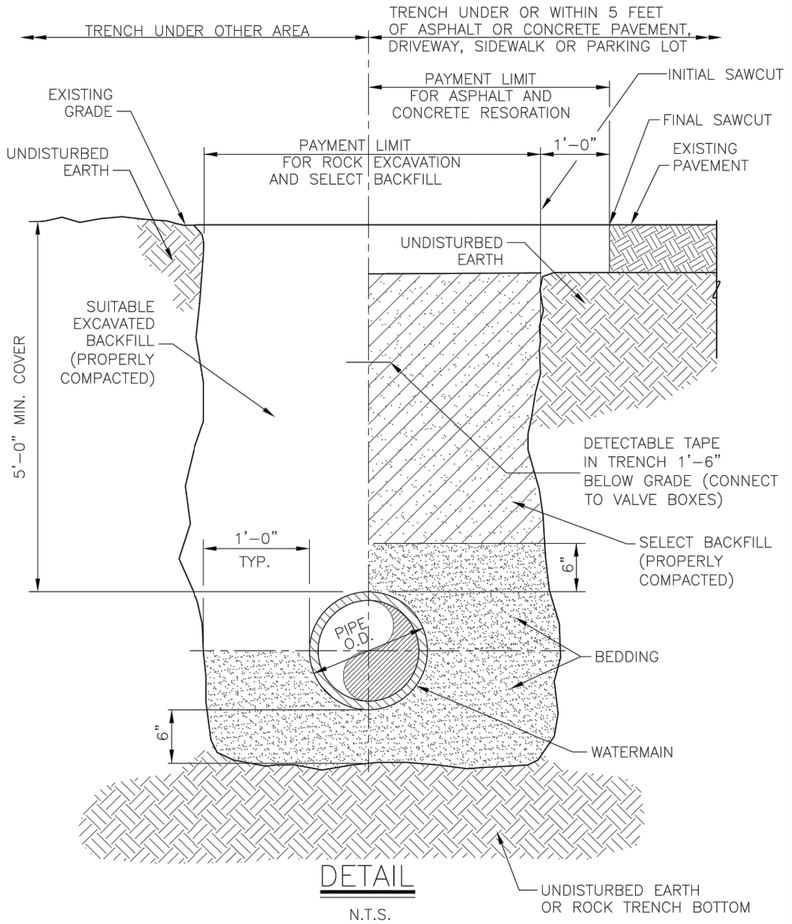
Date: MARCH 2022

Scale: AS SHOWN

Drawn/Revised By: WWW

Sheet W-9

File Name: 202200066 - ANDREWS DESIGN

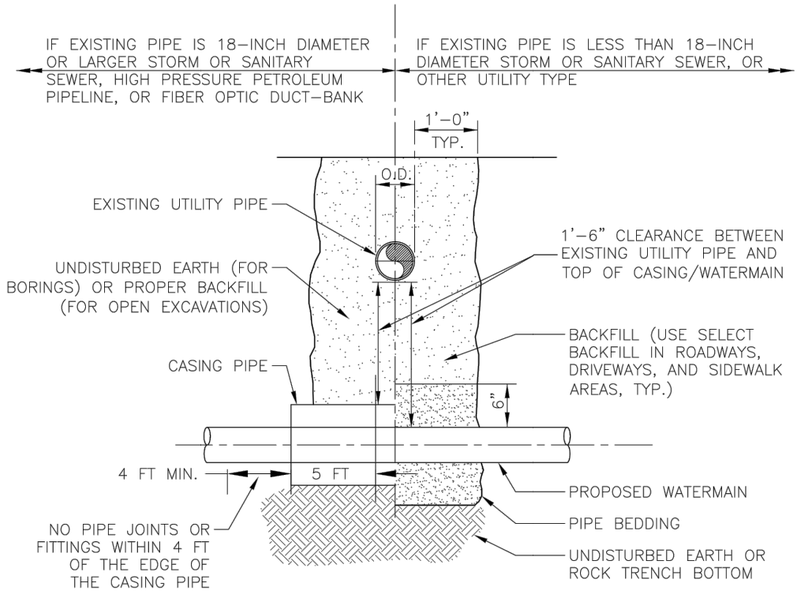


DETAIL

N.T.S.

I:\PUBLIC\ENGINEERING\CURRENT ECWA DETAILS\SD1_TRENCH SWD

ERIE COUNTY WATER AUTHORITY BUFFALO, NEW YORK	STANDARD DETAIL TRENCH THROUGH 16-INCH DIAMETER WATERMAIN	DWG. NO. SD1
		DATE 4/28/92 / REVISED 1/22



SECTION

N.T.S.

NOTES:

1. ALL EXISTING UTILITIES MUST BE SUPPORTED WITH APPROPRIATE CHAINS/STRAPS DURING CONSTRUCTION OF THE NEW WATERMAIN.
2. WHEN CROSSING A SEWERLINE WITH A NEW WATERMAIN (AND WITHOUT CASING PIPE), ONE FULL PIPE LENGTH (18. FT. MIN.) SHALL BE USED AT THE POINT OF CROSSING. THE WATERMAIN SHALL BE PLACED SO THAT BOTH JOINT ENDS ARE AS FAR AS POSSIBLE FROM THE EXISTING SEWERLINE.
3. IF CASING PIPE IS USED, IT SHALL EXTEND 5 FEET BEYOND THE EXISTING PIPE OUTER WALL EDGE IN EACH DIRECTION, AND NO WATERLINE JOINTS OR FITTINGS SHALL BE LOCATED WITHIN 4 FEET FROM THE CASING PIPE EDGE.

I:\PUBLIC\ENGINEERING\CURRENT ECWA DETAILS\SD2_PIPE_CROSSING SWD

ERIE COUNTY WATER AUTHORITY BUFFALO, NEW YORK	STANDARD DETAIL PIPE CROSSING	DWG. NO. SD2
		DATE 4/92 / REVISED 8/21

Approved By:

STATE OF NEW YORK · LEONARD F. KOWALSKI · 084003 · LICENSED PROFESSIONAL ENGINEER

ERIE COUNTY WATER AUTHORITY
3030 UNION RD.
CHEEKTOWAGA NY, 14227

Project Name

ANDREWS AVENUE
WATERMAIN RELOCATION
ECWA PN202200066

TOWN OF CHEEKTOWAGA
ERIE COUNTY - NEW YORK

Name: MISCELLANOUS DETAILS

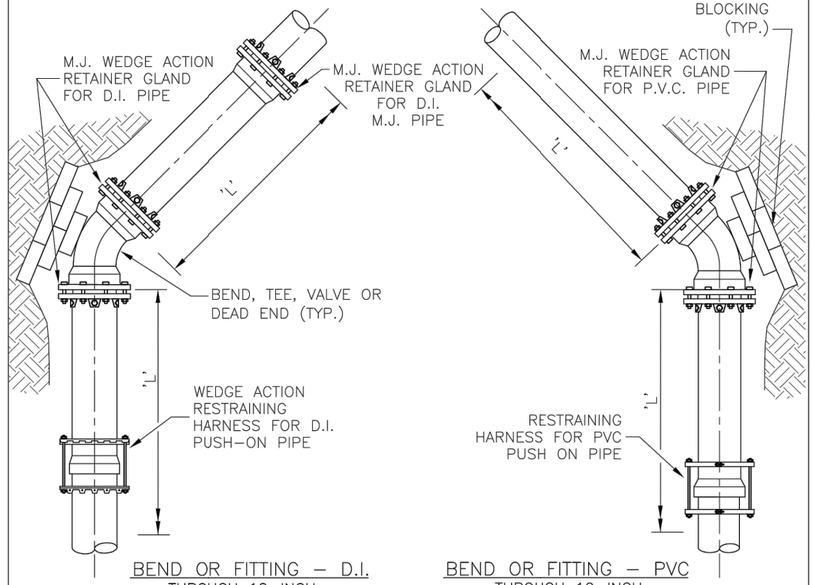
Date: MARCH 2022

Scale: AS SHOWN

Drawn/Revised By: WWW

Sheet W-10

File Name: 202200066 - ANDREWS DESIGN



BEND OR FITTING – D.I.
THROUGH 12–INCH

BEND OR FITTING – PVC
THROUGH 10–INCH

RESTRAINED JOINT SCHEDULE

PIPE SIZE	PIPE TYPE	11.25° ELBOW	22.5° ELBOW	45° ELBOW	TEE BRANCH, 90° BEND, VALVE OR DEAD END
		'L'	'L'	'L'	'L'
8"	PVC/DIP	13'/12'	25'/23'	48'/45'	99'/94'
10"	PVC/DIP	15'/14'	30'/28'	57'/54'	120'/112'
12"	DIP	16'	32'	63'	130'
16"	DIP	20'	40'	81'	170'

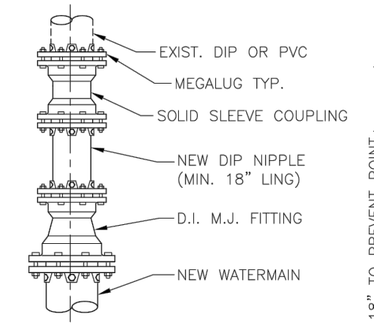
NOTES:

1. DIMENSION 'L' REPRESENTS THE LENGTH OF RESTRAINING PIPE REQUIRED IN FEET EACH SIDE OF THE PIPE FITTING.

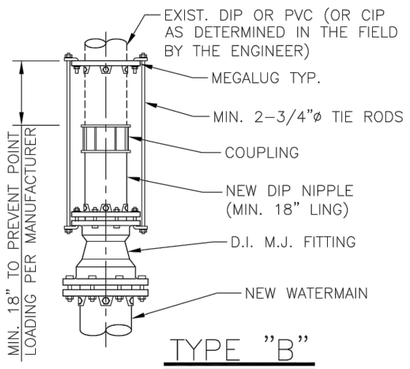
PLAN
N.T.S.

I:\PUBLIC\ENGINEERING\CURRENT ECWA DETAILS\SD4_REST_JOINT_SCHED

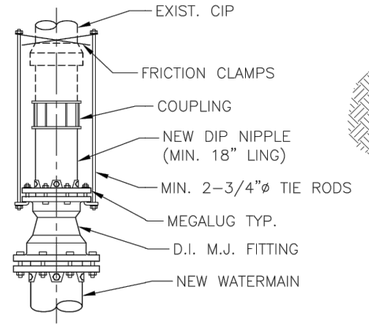
ERIE COUNTY WATER AUTHORITY BUFFALO, NEW YORK	STANDARD DETAIL RESTRAINED JOINT SCHEDULE	DWG. NO. SD4
		DATE 4/28/92 / REVISED 7/16



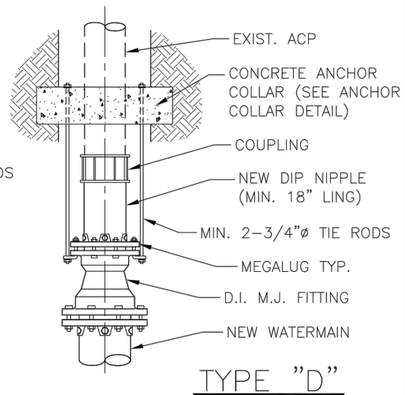
TYPE "A"
CONNECTION TO DIP OR PVC
N.T.S.



TYPE "B"
CONNECTION TO DIP, PVC OR CIP
N.T.S.



TYPE "C"
CONNECTION TO CIP
N.T.S.



TYPE "D"
CONNECTION TO ACP
N.T.S.

NOTES:

1. VALVES AND TEES MAY BE HARNESSED SIMILARLY.
2. HARNESSING IS FOR RESISTANCE TO INTERNAL PRESSURE–PIPE ITSELF MUST BE SUPPORTED ON FIRM BEDDING AND CAREFULLY BACKFILLED.
3. COAT ALL EXPOSED SURFACES OF HARNESS ASSEMBLY WITH BITUMINOUS COATING.
4. TIE RODS SHALL BE PLACED ON SIDES OF PIPE.

I:\PUBLIC\ENGINEERING\CURRENT ECWA DETAILS\SD5_CONN_EXIST_WMAIN

ERIE COUNTY WATER AUTHORITY BUFFALO, NEW YORK	STANDARD DETAIL TYPICAL CONNECTION TO EXISTING WATERMAIN THROUGH 12–INCH DIAMETER WATERMAIN	DWG. NO. SD5
		DATE 3/05 / REVISED 7/16

Approved By:

STATE OF NEW YORK · LEONARD F. KOWALSKI · 084003 · LICENSED PROFESSIONAL ENGINEER

ERIE COUNTY WATER AUTHORITY
3030 UNION RD.
CHEEKTOWAGA NY, 14227

Project Name

ANDREWS AVENUE
WATERMAIN RELOCATION
ECWA PN202200066

TOWN OF CHEEKTOWAGA
ERIE COUNTY - NEW YORK

Name: MISCELLANOUS DETAILS

Date: MARCH 2022

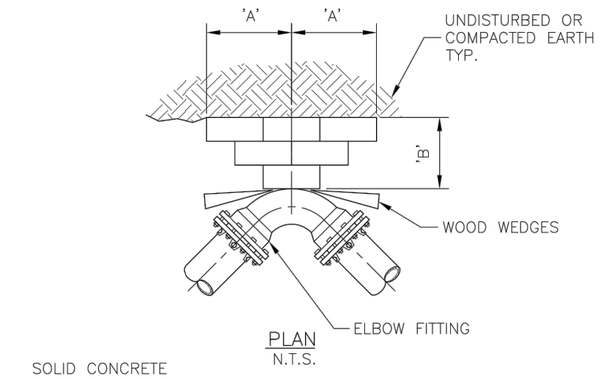
Scale: AS SHOWN

Drawn/Revised By: WWW

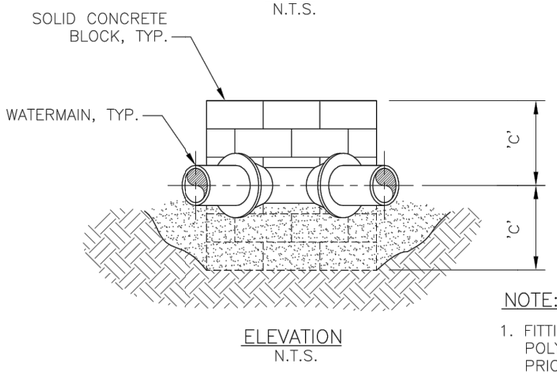
Sheet

W-11

File Name: 202200066 - ANDREWS DESIGN



PLAN
N.T.S.



ELEVATION
N.T.S.

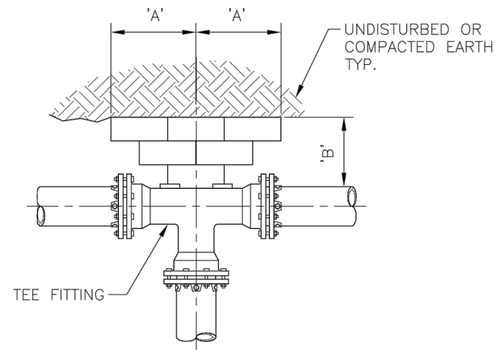
NOTE:

1. FITTING TO BE POLYTHYLENE WRAPPED PRIOR TO BEDDING AND CONCRETE BLOCK PLACEMENT.

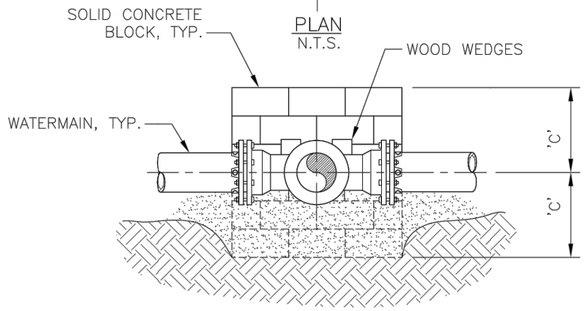
DIMENSION SCHEDULE												
PIPE SIZE	11.25° ELBOW			22.5° ELBOW			45° ELBOW			90° ELBOW		
	'A'	'B'	'C'	'A'	'B'	'C'	'A'	'B'	'C'	'A'	'B'	'C'
6"	0'-6"	1'-0"	0'-6"	0'-6"	1'-0"	0'-6"	0'-9"	1'-0"	0'-9"	1'-0"	1'-0"	0'-9"
8"	1'-0"	1'-0"	0'-6"	1'-0"	1'-0"	0'-6"	1'-3"	1'-3"	0'-9"	1'-3"	1'-3"	0'-9"
10"	1'-0"	1'-0"	0'-9"	1'-0"	1'-0"	0'-9"	1'-6"	1'-6"	1'-0"	1'-6"	1'-6"	1'-0"
12"	1'-6"	1'-6"	1'-0"	1'-0"	1'-6"	1'-0"	1'-9"	1'-6"	1'-0"	2'-0"	1'-6"	2'-0"

I:\PUBLIC\ENGINEERING\CURRENT ECWA DETAILS\SD6_THRUST_BLOCKS_ELBOW

ERIE COUNTY WATER AUTHORITY BUFFALO, NEW YORK	STANDARD DETAIL THRUST BLOCKS FOR ELBOW FITTING	DWG. NO. SD6
		DATE 4/28/92
		REVISED 11/20



PLAN
N.T.S.



ELEVATION
N.T.S.

NOTES:

1. THRUST BLOCK REQUIRED FOR TEES, HYDRANT LATERAL TEES AND TAPPING SLEEVE INSTALLATIONS.
2. FITTING TO BE POLYETHYLENE WRAPPED PRIOR TO BEDDING AND CONCRETE BLOCK.

BRANCH TEE SIZE	DIMENSION SCHEDULE		
	'A'	'B'	'C'
8"	1'-3"	1'-6"	1'-6"
10"	1'-6"	1'-6"	2'-0"
12"	2'-0"	1'-6"	2'-0"

I:\PUBLIC\ENGINEERING\CURRENT ECWA DETAIL\SD7_THRUST_BLOCKS_TEE

ERIE COUNTY WATER AUTHORITY BUFFALO, NEW YORK	STANDARD DETAIL THRUST BLOCKS FOR TEE OR "DEAD END" FITTING	DWG. NO. SD7
		DATE 4/28/92
		REVISED 11/20

Approved By:

STATE OF NEW YORK
LEONARD F. KOWALSKI
084003
LICENSED PROFESSIONAL ENGINEER

ERIE COUNTY WATER AUTHORITY
3030 UNION RD.
CHEEKTOWAGA NY, 14227

Project Name

ANDREWS AVENUE
WATERMAIN RELOCATION
ECWA PN202200066

TOWN OF CHEEKTOWAGA
ERIE COUNTY - NEW YORK

Name: MISCELLANOUS DETAILS

Date: MARCH 2022

Scale: AS SHOWN

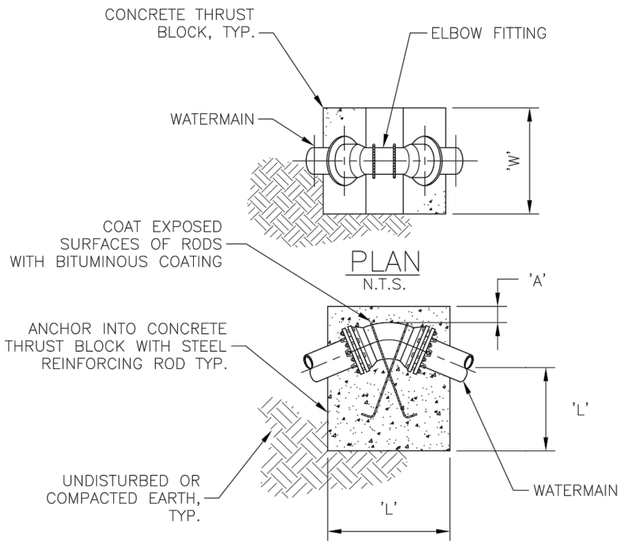
Drawn/Revised By: WWW

Sheet

W-12

Page: 12 of 21

File Name: 202200066 - ANDREWS DESIGN



ELEVATION
N.T.S.

NOTE:

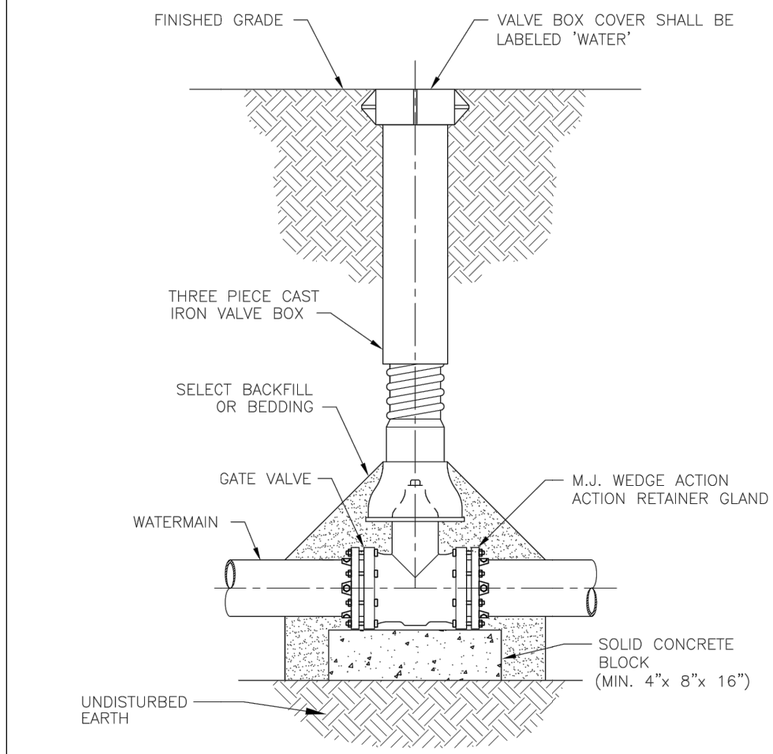
1. FITTING AND ALL RESTRAINTS TO BE POLYETHYLENE WRAPPED PRIOR TO CONCRETE PLACEMENT.

DIMENSION SCHEDULE

PIPE SIZE	PIPE TYPE	11.25° ELBOW				22.5° ELBOW				45° ELBOW			
		'A'	'W'	'L'	ROD ø	'A'	'W'	'L'	ROD ø	'A'	'W'	'L'	ROD ø
8"	PVC/DIP	1'-0"	3'-0"	3'-0"	1/2"	1'-0"	3'-6"	3'-6"	1/2"	1'-0"	4'-0"	4'-6"	1/2"
10"	PVC/DIP	1'-0"	3'-6"	3'-6"	1/2"	1'-0"	4'-0"	4'-0"	1/2"	1'-0"	4'-6"	4'-9"	1/2"
12"	DIP	1'-0"	4'-0"	4'-0"	1/2"	1'-0"	4'-6"	4'-6"	1/2"	1'-0"	5'-0"	5'-0"	1/2"

I:\PUBLIC\ENGINEERING\CURRENT ECWA DETAILS\SD8_THRUST_BLOCKS_VBEND

ERIE COUNTY WATER AUTHORITY BUFFALO, NEW YORK	STANDARD DETAIL THRUST BLOCKS FOR VERTICAL BEND	DWG. NO. SD8	
		DATE 4/28/92	REVISED 11/20



NOTES:

1. VALVE SHALL NOT SUPPORT VALVE BOX.
2. GATE VALVE SHALL BE INSTALLED LEVEL.
3. VALVE BOX SHALL BE PLUMB TO GRADE, WITH OPERATING NUT CENTERED IN BOX.

SECTION
N.T.S.

I:\PUBLIC\ENGINEERING\CURRENT ECWA DETAILS\SD11_GATE_VALVE_SET

ERIE COUNTY WATER AUTHORITY BUFFALO, NEW YORK	STANDARD DETAIL GATE VALVE SETTING	DWG. NO. SD11	
		DATE 4/28/92	REVISED 02/17

Approved By:

STATE OF NEW YORK
LEONARD F. KOWALSKI
084003
LICENSED PROFESSIONAL ENGINEER

ERIE COUNTY WATER AUTHORITY
3030 UNION RD.
CHEEKTOWAGA NY, 14227

Project Name

ANDREWS AVENUE
WATERMAIN RELOCATION
ECWA PN202200066

TOWN OF CHEEKTOWAGA
ERIE COUNTY - NEW YORK

Name: MISCELLANOUS DETAILS

Date: MARCH 2022

Scale: AS SHOWN

Drawn/Revised By: WWW

Sheet

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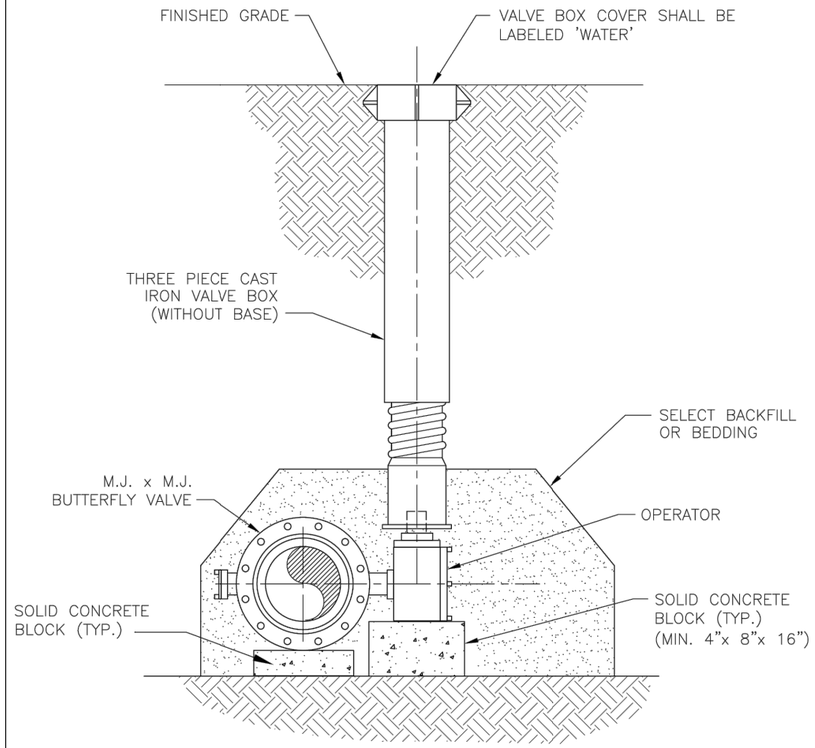
File Name: 202200066 - ANDREWS DESIGN



NOTES:

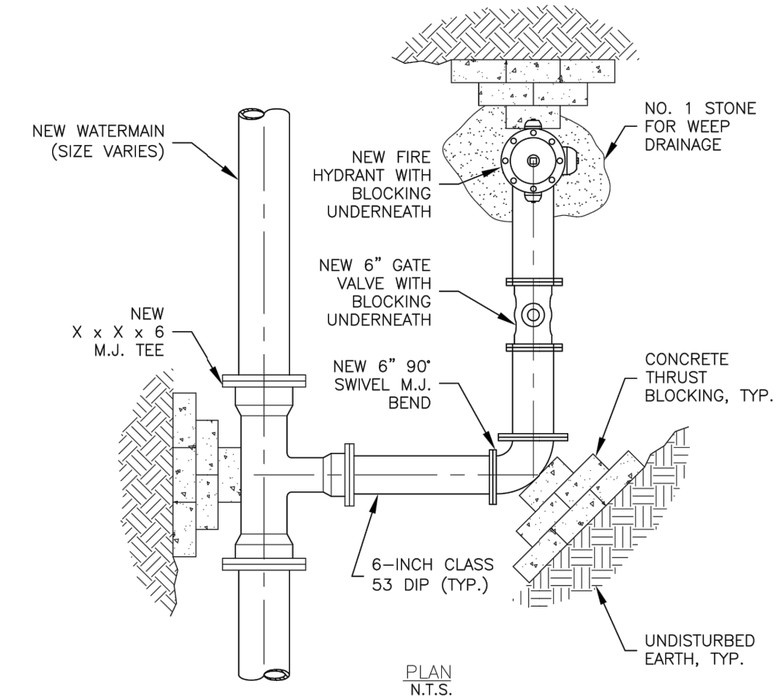
1. VALVE SHALL NOT SUPPORT VALVE BOX.
2. BUTTERFLY VALVE SHALL BE INSTALLED LEVEL.
3. VALVE BOX SHALL BE PLUMB TO GRADE, WITH OPERATING NUT CENTERED.
4. POSITION VALVE SO THAT OPERATOR IS ON SIDE OF WATERMAIN OPPOSITE THE ℄ OF ROADWAY.

SECTION

N.T.S.

I:\PUBLIC\ENGINEERING\CURRENT ECWA DETAILS\SD12_BFLY_VALVE_SET

ERIE COUNTY WATER AUTHORITY BUFFALO, NEW YORK	STANDARD DETAIL BUTTERFLY VALVE SETTING	DWG. NO. SD12	
		DATE 6/00	REVISED 02/17



PLAN
N.T.S.

NOTES:

1. THIS DETAIL IS ONLY TO BE USED WHERE THERE IS INSUFFICIENT RIGHT-OF-WAY TO INSTALL A PERPENDICULAR HYDRANT ASSEMBLY AND WHEN APPROVED BY THE AUTHORITY.
2. USE 6-INCH 90 DEGREE SWIVEL MECHANICAL JOINT (M.J.) BEND AS SHOWN.
3. HYDRANT RISER SHALL BE INSTALLED PLUMB.
4. ALL JOINTS ARE TO BE FULLY RESTRAINED.
5. ALL DUCTILE IRON PIPE AND FITTINGS TO BE POLYWRAPPED.
6. HYDRANT VALVE SHALL NOT BE PLACED IN SIDEWALKS OR DRIVEWAYS.
7. COMPLY WITH ALL REQUIREMENTS DEPICTED ON THE FIRE HYDRANT INSTALLATION DETAIL.
8. PIPE LENGTHS WILL VARY BASED ON FIELD CONDITIONS.

I:\PUBLIC\ENGINEERING\CURRENT ECWA DETAILS\SD15_HYDRANT_ASSEMBLY_WITH_BEND SWD

ERIE COUNTY WATER AUTHORITY BUFFALO, NEW YORK	STANDARD DETAIL HYDRANT ASSEMBLY WITH BEND	DWG. NO. SD15	
		DATE 11/20	REVISED

Approved By:

STATE OF NEW YORK
LEONARD F. KOWALSKI
084003
LICENSED PROFESSIONAL ENGINEER

ERIE COUNTY WATER AUTHORITY
3030 UNION RD.
CHEEKTOWAGA NY, 14227

Project Name

ANDREWS AVENUE
WATERMAIN RELOCATION
ECWA PN202200066

TOWN OF CHEEKTOWAGA
ERIE COUNTY - NEW YORK

Name: MISCELLANOUS DETAILS

Date: MARCH 2022

Scale: AS SHOWN

Drawn/Revised By: WWW

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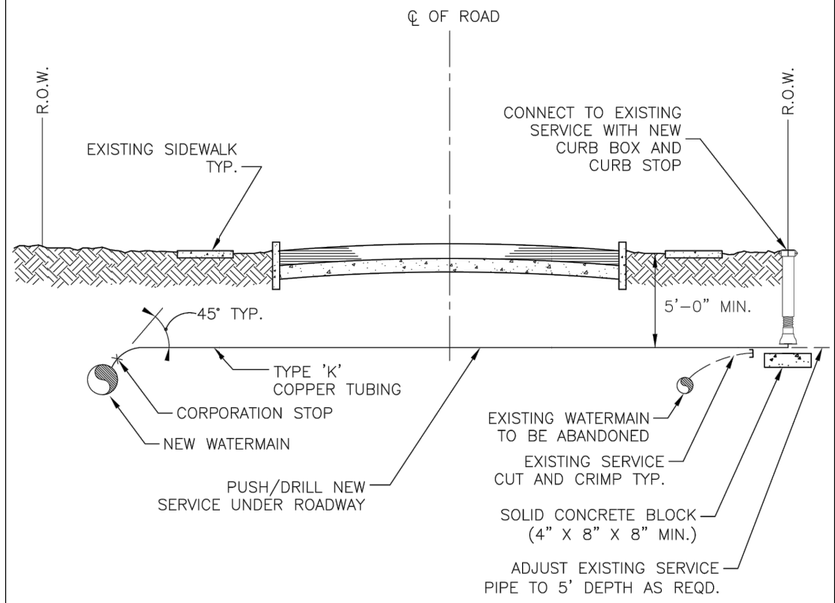
File Name: 202200066 - ANDREWS DESIGN

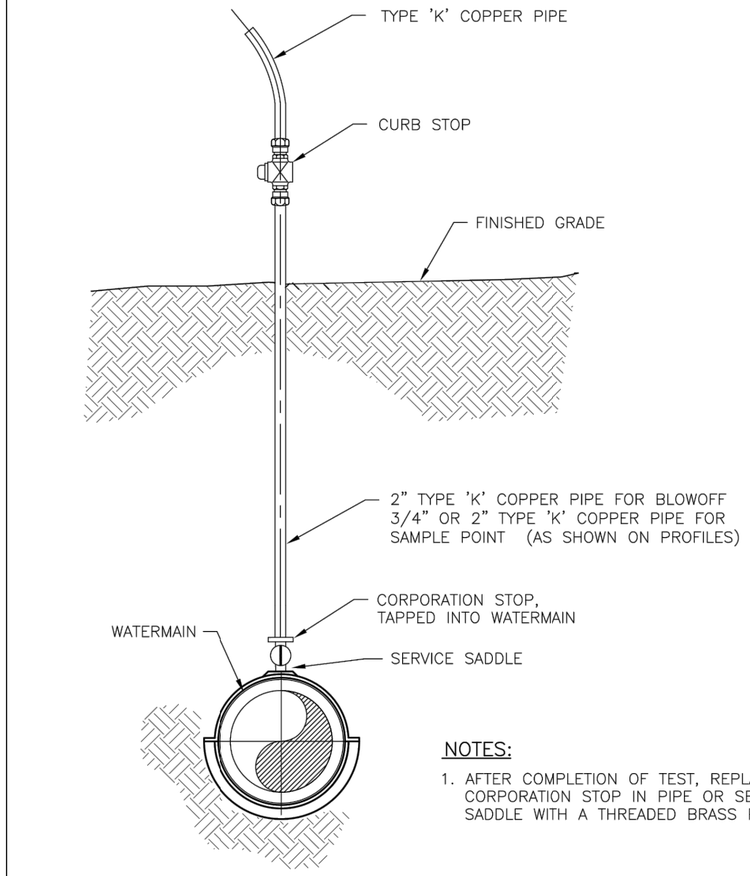


NOTES:

1. EXISTING SERVICES SHALL BE CRIMPED AND ABANDONED IN PLACE.
2. SERVICE SADDLES SHALL BE USED UNDER THE FOLLOWING CONDITIONS:
   A. WHEN SERVICES AND PLACED ON 4" OR SMALLER PIPES.
   B. WHEN SERVICES LARGER THAN 1" ARE PLACED ON A 6" PIPE.
   C. WHEN SERVICES LARGER THAN 1 1/2" ARE PLACED ON AN 8" PIPE.
   D. WHEN SERVICES LARGER THAN 1 1/2" ARE PLACED ON DUCTILE IRON PIPE.
   E. WHEN TAPPING ALL PLASTIC (PVC) PIPE.
   F. WHEN TAPPING ALL ASBESTOS–CEMENT PIPE.
3. CURB BOXES SHALL NOT BE PLACED IN SIDEWALKS, DRIVEWAYS, OR CURB RAMPS.
4. USE POLYETHYLENE FOR 3/4" AND 1" SERVICES GREATER THAN 100 FEET IN LENGTH, AND FOR 1–1/2" AND 2" SERVICES GREATER THAN 60 FEET IN LENGTH. ALL POLYETHYLENE SERVICES SHALL INCLUDE A TRACER WIRE FOR DETECTION BY ECWA FORCES.
5. UNIONS ON COPPER TUBING ARE NOT ALLOWED UNLESS APPROVED BY ECWA PRIOR TO INSTALLATION.

I:\PUBLIC\ENGINEERING\CURRENT ECWA DETAILS\SD16_SERVICE_REPLACE SWD

ERIE COUNTY WATER AUTHORITY BUFFALO, NEW YORK	STANDARD DETAIL SERVICE REPLACEMENT/INSTALLATION	DWG. NO. SD16	
		DATE 4/92	REVISED 10/20



NOTES:

1. AFTER COMPLETION OF TEST, REPLACE CORPORATION STOP IN PIPE OR SERVICE SADDLE WITH A THREADED BRASS PLUG.

ELEVATION

N.T.S.

I:\PUBLIC\ENGINEERING\2005_DETAILS\SD17_TEMP_BO_SAMP_PT

ERIE COUNTY WATER AUTHORITY BUFFALO, NEW YORK	STANDARD DETAIL TEMPORARY BLOW–OFF/SAMPLING POINT	DWG. NO. SD17	
		DATE 4/28/92	REVISED 10/05

Approved By:

STATE OF NEW YORK · LEONARD F. KOWALSKI · 084003 · LICENSED PROFESSIONAL ENGINEER

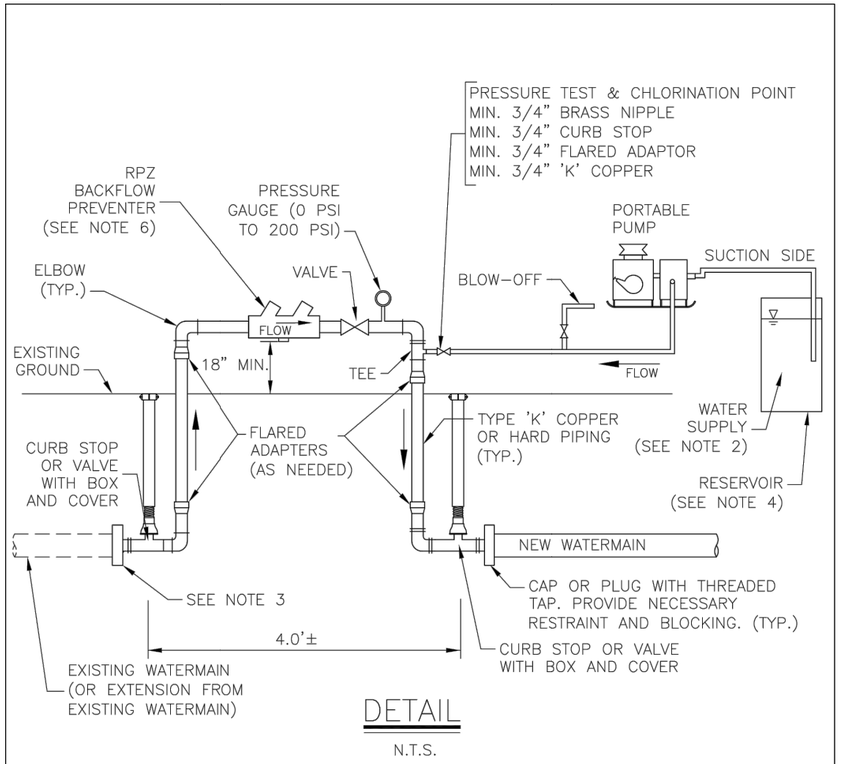
ERIE COUNTY WATER AUTHORITY
3030 UNION RD.
CHEEKTOWAGA NY, 14227

Project Name

ANDREWS AVENUE
WATERMAIN RELOCATION
ECWA PN202200066

TOWN OF CHEEKTOWAGA
ERIE COUNTY - NEW YORK

Name: MISCELLANOUS DETAILS	Sheet W-15
Date: MARCH 2022	Page: 15 of 21
Scale: AS SHOWN	
Drawn/Revised By: WWW	File Name: 202200066 - ANDREWS DESIGN



DETAIL

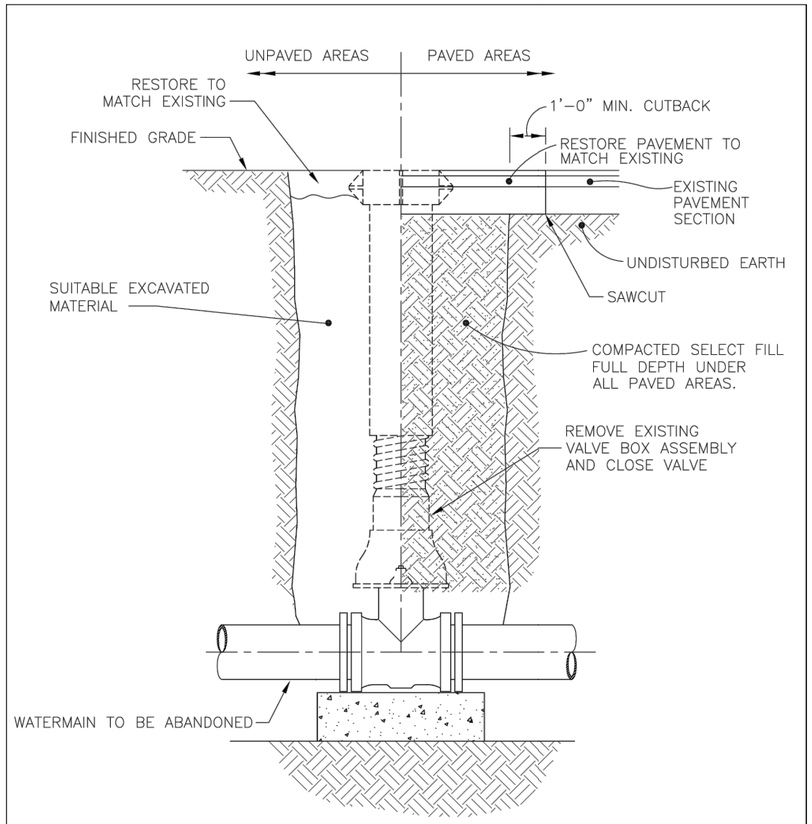
N.T.S.

NOTES:

1. BACTERIOLOGICAL WATER SAMPLES SHALL BE TAKEN AT BEGINNING AND END OF NEW WATERMAIN SECTION AND AT MAXIMUM 1,000 FT. SPACINGS.
2. PROVIDE CLEAN WATER SUPPLY FOR PRESSURE TESTING. PROVIDE CHLORINATED WATER SUPPLY FOR DISINFECTION.
3. CAP OR PLUG WITH THREADED TAP OR APPROPRIATE TAP INTO MAIN. PROVIDE NECESSARY RESTRAINT AND BLOCKING.
4. DIAMETER OF RESERVOIR SHALL BE 15" OR LESS. IF DIAMETER IS GREATER THAN 15", LEAKAGE TEST SHALL BE RUN A MINIMUM OF 4 HOURS.
5. PRESSURE TEST CANNOT EXCEED 2,000 LINEAR FEET PER TEST SECTION.
6. BACKFLOW PREVENTER TO BE SIZED TO ACHIEVE MIN 3 FPS SCOUR VELOCITY DURING FLUSHING OF NEW WATERLINE.

I:\PUBLIC\ENGINEERING\CURRENT ECWA DETAILS\SD23_PRESS_TEST_SCHEM

ERIE COUNTY WATER AUTHORITY BUFFALO, NEW YORK	STANDARD DETAIL PRESSURE TESTING AND DISINFECTION APPARATUS SCHEMATIC	DWG. NO. SD23	
		DATE 6/00	REVISED 11/20



ELEVATION

N.T.S.

I:\PUBLIC\ENGINEERING\CURRENT ECWA DETAILS\SD26_EXIST_VBOX_ABAND

ERIE COUNTY WATER AUTHORITY BUFFALO, NEW YORK	STANDARD DETAIL EXISTING VALVE BOX ABANDONMENT	DWG. NO. SD26	
		DATE 6/00	REVISED 8/16

Approved By:

STATE OF NEW YORK · LEONARD F. KOWALSKI · 084003 · LICENSED PROFESSIONAL ENGINEER

ERIE COUNTY WATER AUTHORITY
3030 UNION RD.
CHEEKTOWAGA NY, 14227

Project Name

ANDREWS AVENUE
WATERMAIN RELOCATION
ECWA PN202200066

TOWN OF CHEEKTOWAGA
ERIE COUNTY - NEW YORK

Name: MISCELLANOUS DETAILS

Date: MARCH 2022

Scale: AS SHOWN

Drawn/Revised By: WWW

Sheet W-16

File Name: 202200066 - ANDREWS DESIGN

NOTES

1. All elevations refer to USGS NAVD88 datum.
2. The CONTRACTOR shall obtain necessary permits and furnish copies to the ENGINEER prior to commencing work.
3. The CONTRACTOR work area shall be confined to the limits of the right-of-ways and easements. The CONTRACTOR shall obtain any additional easements or work releases should the CONTRACTOR require additional area to accommodate his operations.
4. The CONTRACTOR shall provide maintenance and protection of traffic in accordance with the Erie County Highway Department standards and the NYSDOT Manual of Uniform Traffic Control Devices.
5. The locations and depths of existing underground utilities as shown on the plans and profiles are approximate. Other underground utilities not shown may be encountered. The CONTRACTOR shall perform test pits to verify the location and elevation of utilities at interconnections and crossings as shown, directed or required. The CONTRACTOR shall excavate in advance of the pipe laying operation and expose all existing underground utilities to prevent damage during construction and to determine required changes in grade necessary to install watermain to avoid conflicts.
6. The CONTRACTOR shall install those measures required to limit erosion of areas disturbed by the work. Clearing shall be performed on an as needed basis, phased to reduce erosion and visual impact.
7. Blasting will not be permitted.
8. No more than one connection may be made to any existing watermain prior to testing, disinfection, and approval of the Waterline Installation Completed Works Approval Report(s) by the Erie County Water Authority and the Erie County Health Department.
9. The Erie County Water Authority only shall operate existing valves and fire hydrants, including newly installed valves and fire hydrants that have been placed into service. The CONTRACTOR is advised that watertight conditions may not exist when existing valves are closed.
10. The CONTRACTOR shall have all equipment, manpower, and materials required on site and ready for use prior to commencing any shut-down or removing any existing facilities from service. The CONTRACTOR shall notify all affected customers of any shut-down at least 48 hours in advance. The CONTRACTOR shall notify the appropriate fire stations 48 hours in advance prior to taking any fire hydrants out of service. Any fire hydrants not in service shall be bagged in burlap or plastic. Any shut-down shall be limited to 4 consecutive hours. It may be necessary to schedule shut-downs at night, weekends, or other off hours so as to not affect schools, businesses or other customers, as determined by the ENGINEER. Shut-down requests shall be submitted to the Erie County Water Authority a minimum of 5 business days in advance of the requested shut-down date.

\\PUBLIC\ENGINEERING\CURRENT ECWA DETAILS\SD29_GENERAL_NOTES

ERIE COUNTY WATER AUTHORITY BUFFALO, NEW YORK	STANDARD DETAIL GENERAL NOTES	SD29 DATE 3/05 REVISED 11/21

11. All watermain piping shall be installed with a minimum of 5'-0" of cover.
12. All watermain piping shall be installed with a minimum of 1'-6" of vertical clearance and 10'-0" of horizontal clearance from sanitary and storm piping, measured from the outside of the pipes at the point of crossing.
13. If the material at the design grade is unsuitable as determined by the ENGINEER, the CONTRACTOR, when ordered in writing, shall excavate additional material to the depth necessary and shall backfill to the proposed grade with the select granular material.
14. The installation of the 90 degree bends in the watermain is not allowed, unless approved by the Erie County Water Authority.
15. Thrust restraint for watermain piping through 12-inch diameter shall consist of thrust blocks and pipe joint restraint.
16. The CONTRACTOR shall notify the owner of any utility pole in advance of any excavation work that will take place within 5'-0" of the utility pole. The CONTRACTOR shall include the cost of temporary pole support in the appropriate bid item.Where utility poles are required to be supported during construction, the CONTRACTOR shall make all necessary arrangements with the utility company.
17. If materials are encountered during the construction that are suspected of being contaminated, the CONTRACTOR shall immediately notify the NYSDEC for direction regarding testing, separation, containment and disposal procedures.
18. Existing fire hydrants removed during construction and not reinstalled as part of the work shall be returned to the Erie County Water Authority Service Center, 3030 Union Road, Cheektowaga.
19. The CONTRACTOR shall place temporary pavement (consisting of hot mix asphalt or cold patch) in all trench excavations in traveled areas including roads, driveways, sidewalks, and parking areas.
20. The CONTRACTOR shall not restrict school bus access.
21. The use of existing fire hydrants for any reason is prohibited without prior approval of the Erie County Water Authority. This includes newly installed fire hydrants that have been placed into service.
22. The CONTRACTOR shall submit procedures for testing and disinfection of the watermain to the ENGINEER for approval.
23. The CONTRACTOR shall be present and assist in the Final Walk inspection. The CONTRACTOR shall provide sufficient personnel and equipment to demonstrate to the ENGINEER that all valves, fire hydrants and curb stops operate as required.

\\PUBLIC\ENGINEERING\CURRENT ECWA DETAILS\SD30_GENERAL_NOTES

ERIE COUNTY WATER AUTHORITY BUFFALO, NEW YORK	STANDARD DETAIL GENERAL NOTES	DWG. NO. SD30 DATE 3/05 REVISED 10/21

Approved By:

STATE OF NEW YORK
LEONARD F. KOWALSKI
084003
LICENSED PROFESSIONAL ENGINEER

ERIE COUNTY WATER AUTHORITY
3030 UNION RD.
CHEEKTOWAGA NY, 14227

Project Name

ANDREWS AVENUE
WATERMAIN RELOCATION
ECWA PN202200066

TOWN OF CHEEKTOWAGA
ERIE COUNTY - NEW YORK

Name: MISCELLANOUS DETAILS

Date: MARCH 2022

Scale: AS SHOWN

Drawn/Revised By: WWW

Sheet

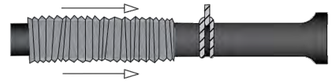
W-17

File Name: 202200066 - ANDREWS DESIGN

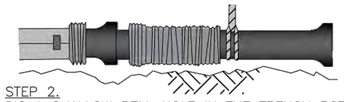
PIPE DIAMETER (in)	PIPE MATERIAL		WORKING PRESSURE (psi)	TEST PRESSURE (psi)
	Type (DIP, PVC, etc.)	Rating (Class/DR)		
8"	DIP	CLASS 52	100	175
12"	DIP	CLASS 52	100	175

I:\PUBLIC\ENGINEERING\CURRENT ECWA DETAILS\SD31_PRESS_TEST_SCHED

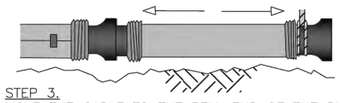
ERIE COUNTY WATER AUTHORITY BUFFALO, NEW YORK	PRESSURE TESTING SCHEDULE	DWG. NO. SD31	
		DATE 10/05	REVISED 11/20



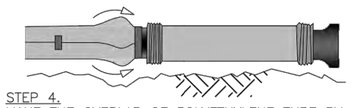
STEP 1.
CUT A SECTION OF POLYETHYLENE TUBE APPROXIMATELY 2 FEET LONGER THAN THE PIPE SECTION. REMOVE ALL LUMPS OF CLAY, MUD, CINDERS, OR OTHER MATERIALS THAT MIGHT HAVE ACCUMULATED ON THE PIPE SURFACE DURING STORAGE. SLIP THE POLYETHYLENE TUBE ACCORDION–FASHION ON THE END OF THE PIPE. PULL BACK THE OVERHANGING END OF THE TUBE UNTIL IT CLEARS THE PIPE END.



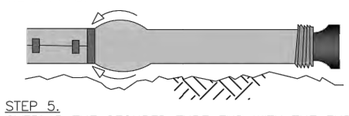
STEP 2.
DIG A SHALLOW BELL HOLE IN THE TRENCH BOTTOM AT THE JOINT LOCATION TO FACILITATE INSTALLATION OF THE POLYETHYLENE TUBE. LOWER THE PIPE INTO THE TRENCH AND MAKE UP THE PIPE JOINT WITH THE PROCEEDING SECTION OF PIPE.



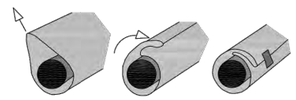
STEP 3.
MOVE THE CABLE TO THE BELL END OF THE PIPE AND LIFT THE PIPE SLIGHTLY TO PROVIDE ENOUGH CLEARANCE TO EASILY SLIDE THE TUBE. SPREAD THE TUBE OVER THE ENTIRE BARREL OF THE PIPE. NOTE: MAKE SURE THAT NO DIRT OR OTHER BEDDING MATERIAL BECOMES TRAPPED BETWEEN THE WRAP AND THE PIPE.



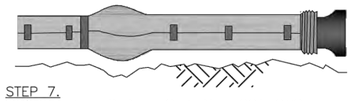
STEP 4.
MAKE THE OVERLAP OF POLYETHYLENE TUBE BY PULLING BACK THE BUNCHED POLYETHYLENE FROM THE PRECEDING LENGTH OF PIPE AND SECURING IT IN PLACE. NOTE: THE POLYETHYLENE MAY BE SECURED IN PLACE BY USING TAPE OR PLASTIC TIE STRAPS.



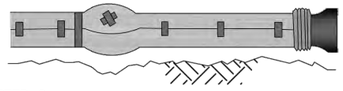
STEP 5.
OVERLAP THE SECURED TUBE END WITH THE END OF THE NEW PIPE SECTION, FOR A MINIMUM OF 12 INCHES. SECURE THE NEW TUBE END IN PLACE. PIPE JOINT SHOULD HAVE TWO LAYERS OF POLYWRAP, EACH SECURED IN PLACE.



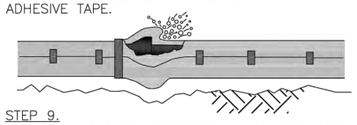
STEP 6.
TAKE UP THE SLACK IN THE TUBE ALONG THE BARREL OF THE PIPE TO MAKE A SNUG, BUT NOT TIGHT, FIT. FOLD EXCESS POLYETHYLENE BACK OVER THE TOP OF THE PIPE.



STEP 7.
SECURE THE FOLD AT SEVERAL LOCATIONS ALONG THE PIPE BARREL (APPROXIMATELY EVERY 3 FEET, MAXIMUM OF 5 FEET).



STEP 8.
REPAIR ALL THE SMALL RIPS, TEARS, OR OTHER TUBE DAMAGE WITH ADHESIVE TAPE. IF THE POLYETHYLENE IS BADLY DAMAGED, REPAIR THE DAMAGED AREA WITH A SHEET OF POLYETHYLENE AND SEAL THE EDGES OF THE REPAIR WITH ADHESIVE TAPE.



STEP 9.
CAREFULLY BACKFILL THE TRENCH ACCORDING TO THE PROCEDURES IN AWWA C600 STANDARD. TO PREVENT DAMAGE DURING BACKFILLING ALLOW ADEQUATE SLACK IN THE TUBE AT THE JOINT. BACKFILL SHOULD BE FREE OF CINDERS, ROCKS, BOULDERS, NAILS, STICKS, OR OTHER MATERIALS THAT MIGHT DAMAGE THE POLYETHYLENE. AVOID DAMAGING THE POLYETHYLENE WHEN USING TAMPING DEVICES.

NOTES:
1 – POLYETHYLENE WRAP (POLYWRAP) SHALL BE OF PROPER DIAMETER TO FIT OVER BELLS AND EXTERNAL WEDGE–ACTION RETAINER GLANDS.
2 – CAST AND DUCTILE IRON FITTINGS (BENDS, TEES, VALVES, ETC.) ARE TO BE WRAPPED IN POLYWRAP AND SECURED IN PLACE.
3 – DO NOT USE CHAINS, METAL WIRE, OR OTHER SUPPORTING SYSTEMS WHICH MAY DAMAGE THE POLYETHYLENE ENCASEMENT. REPLACE DAMAGED POLYWRAP ACCORDINGLY.

I:\PUBLIC\ENGINEERING\CURRENT ECWA DETAILS\SD32_POLY_WRAP

ERIE COUNTY WATER AUTHORITY BUFFALO, NEW YORK	STANDARD DETAIL POLYETHYLENE ENCASEMENT OF DUCTILE IRON PIPE	DWG. NO. SD32	
		DATE 06/16	REVISED 02/19

Approved By:

STATE OF NEW YORK
LEONARD F. KOWALSKI
084003
LICENSED PROFESSIONAL ENGINEER

ERIE COUNTY WATER AUTHORITY
3030 UNION RD.
CHEEKTOWAGA NY, 14227

Project Name

ANDREWS AVENUE
WATERMAIN RELOCATION
ECWA PN202200066

TOWN OF CHEEKTOWAGA
ERIE COUNTY - NEW YORK

Name: MISCELLANOUS DETAILS

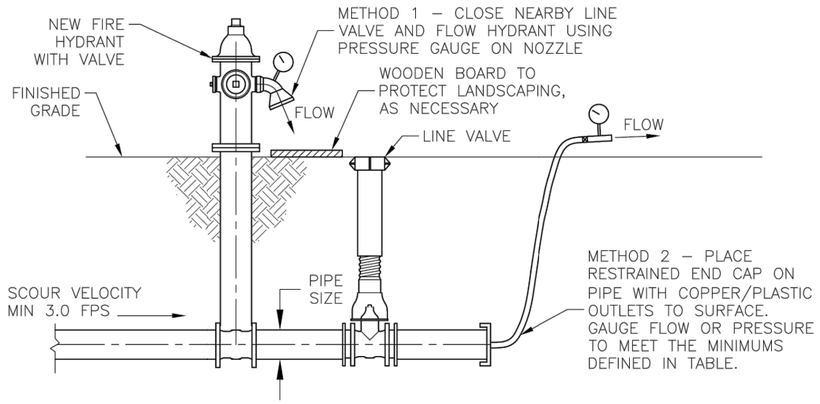
Date: MARCH 2022

Scale: AS SHOWN

Drawn/Revised By: WWW

Sheet W-18

File Name: 202200066 - ANDREWS DESIGN



PIPE SIZE (IN)	REQUIRED FLOW (GPM)	METHOD 1 HYDRANT FLOW		METHOD 2 END CAP FLOW	
		2 1/2" NOZZLE PRESSURE (PSI)	4" NOZZLE PRESSURE (PSI)	2" I.D. PRESSURE (PSI)	3" I.D. PRESSURE (PSI)
6	275	7	1	7	2
8	500	9	2	22	5
10	750	20	4	50	10
12	1100	44	7	–	22
16	1900	–	20	–	62
20	3000	–	50	–	–

I.D. = INNER DIAMETER

NOTES:

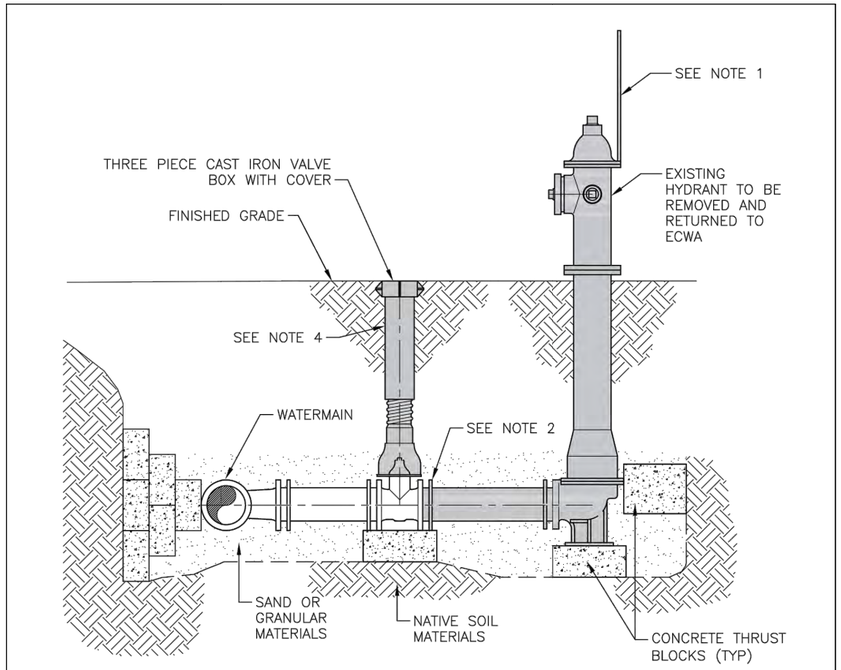
1. TO OBTAIN SCOUR VELOCITY (3.0 FPS) IN THE WATERLINE, CONTRACTOR SHALL ACHIEVE FLOWRATE AT NOZZLE DEFINED IN TABLE. PRESSURE GAUGE USED SHALL SHOW A HIGHER PRESSURE THAN THE MINIMUMS DEFINED IN THE TABLE.
2. OUTLET PRESSURE MEASURED BY PITOT GAUGE.
3. ENGINEER SHALL PROVIDE CALCULATIONS IF CONNECTIONS ARE OTHER THAN THOSE SHOWN, IF MULTIPLE CONNECTIONS ARE USED, OR AS REQUESTED BY ECWA.
4. TO FLUSH THREE PIPE VOLUMES, MINIMUM FLUSHING TIME (IN SECONDS) EQUALS THE LENGTH OF PIPE BEING FLUSHED, IN FEET.

SECTION

N.T.S.

I:\PUBLIC\ENGINEERING\CURRENT ECWA DETAILS\SD36_WATERLINE_FLUSHING

ERIE COUNTY WATER AUTHORITY BUFFALO, NEW YORK	STANDARD DETAIL WATERLINE FLUSHING	DWG. NO. SD36	
		DATE 6/16	REVISED 3/18



PROCEDURE:

1. REMOVE HYDRANT MARKER AND RELOCATE TO NEW HYDRANT, OR RETURN TO APPROPRIATE MUNICIPALITY/FIRE DISTRICT.
2. WHEN WATERLINE IS TO BE ABANDONED, DEPRESSURIZE WATERLINE AND CLOSE WATER VALVE. EXCAVATE HYDRANT ASSEMBLY AND CAREFULLY DISCONNECT HYDRANT FROM GATE VALVE. DO NOT FORCE HYDRANT FROM VALVE WITHOUT PROPERLY DISCONNECTING.
3. WHEN WATERLINE IS TO REMAIN IN SERVICE, PERFORM SCHEDULED SHUTDOWN OF WATERLINE, REMOVE HYDRANT TEE AND REPLACE WITH NEW PIPE AND COUPLINGS.
4. REMOVE HYDRANT, HYDRANT PIPING, VALVE BOX AND COVER.
5. RETURN HYDRANT WITH PIPING TO ERIE COUNTY WATER AUTHORITY SERVICE CENTER, 3030 UNION ROAD, CHEEKTOWAGA, NY. HYDRANT IS TO BE HANDLED CAREFULLY TO AVOID ANY DAMAGE IN REMOVAL AND/OR TRANSIT. UNLOAD HYDRANTS AT LOCATION DEFINED BY ECWA.
6. REMOVE ANY EXISTING CONCRETE BLOCKING, AND FILL EXCAVATION WITH SUITABLE BACKFILL MATERIALS. COMPACT BACKFILL MATERIALS APPROPRIATELY.
7. REGRADE SURFACE TO ENSURE PROPER DRAINAGE. RESTORE SURFACE APPROPRIATELY USING ASPHALT, CONCRETE, AND/OR TOPSOIL/SEED.

SECTION

N.T.S.

I:\PUBLIC\ENGINEERING\CURRENT ECWA DETAILS\SD37_HYD._ABANDON

ERIE COUNTY WATER AUTHORITY BUFFALO, NEW YORK	STANDARD DETAIL FIRE HYDRANT ABANDONMENT	DWG. NO. SD37	
		DATE 1/17	REVISED

Approved By:

STATE OF NEW YORK
LEONARD F. KOWALSKI
084003
LICENSED PROFESSIONAL ENGINEER
EXCELSIOR

ERIE COUNTY WATER AUTHORITY
3030 UNION RD.
CHEEKTOWAGA NY, 14227

Project Name

ANDREWS AVENUE
WATERMAIN RELOCATION
ECWA PN202200066

TOWN OF CHEEKTOWAGA
ERIE COUNTY - NEW YORK

Name: MISCELLANOUS DETAILS

Date: MARCH 2022

Scale: AS SHOWN

Drawn/Revised By: WWW

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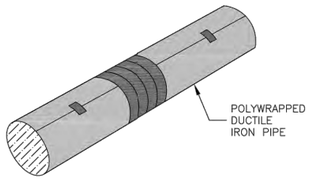
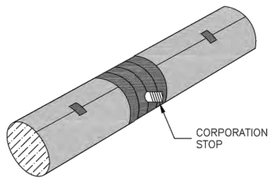
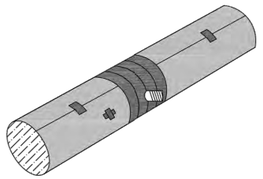
File Name: 202200066 - ANDREWS DESIGN



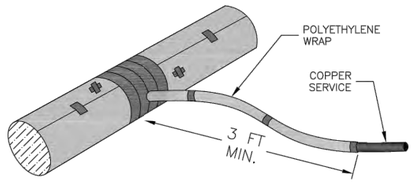
STEP 1.
WRAP TWO OR THREE LAYERS OF TAPE COMPLETELY AROUND THE PIPE WHERE THE TAPPING MACHINE WILL BE PLACED.



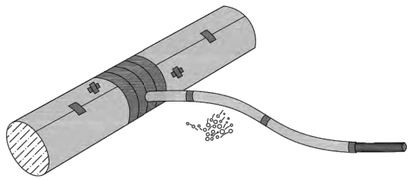
STEP 2.
MOUNT THE TAPPING MACHINE ON THE TAPED AREA AND MAKE THE TAP DIRECTLY THROUGH THE TAPE AND POLYWRAP. INSTALL CORPORATION STOP.



STEP 3.
INSPECT THE ENTIRE AREA FOR DAMAGE AND REPAIR IF NECESSARY.



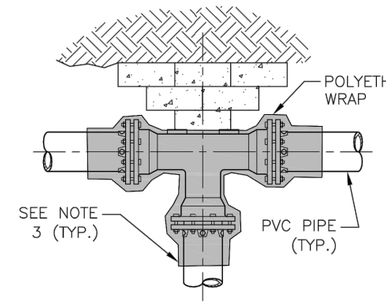
STEP 4.
WRAP ANY CONNECTED COPPER SERVICE LINE WITHIN THREE FEET OF THE PIPE WITH POLYTHYLENE AND SECURE WITH TAPE.



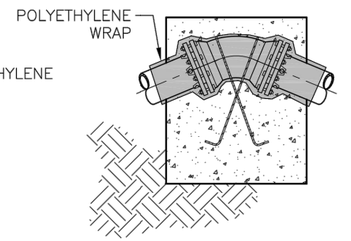
STEP 5.
CAREFULLY BACKFILL THE TRENCH ACCORDING TO THE PROCEDURES IN AWWA C600 STANDARD. TO PREVENT DAMAGE DURING BACKFILLING ALLOW ADEQUATE SLACK IN THE TUBE AT THE JOINT. BACKFILL SHOULD BE FREE OF CINDERS, ROCKS, BOULDERS, NAILS, STICKS, OR OTHER MATERIALS THAT MIGHT DAMAGE THE POLYETHYLENE. AVOID DAMAGING THE POLYETHYLENE WHEN USING TAMPING DEVICES.

I:\PUBLIC\ENGINEERING\CURRENT ECWA DETAILS\SD38_TAP_POLY_WRAP_PIPE

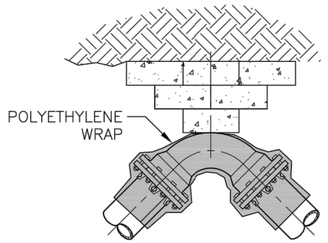
ERIE COUNTY WATER AUTHORITY BUFFALO, NEW YORK	STANDARD DETAIL TAPPING POLYWRAPPED PIPE	DWG. NO. SD38	
		DATE 05/18	REVISED



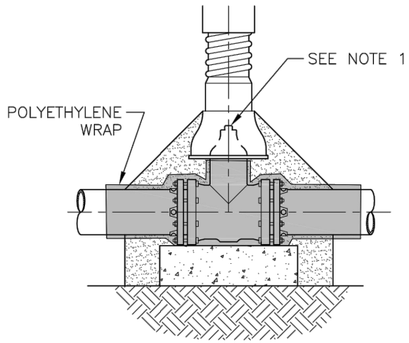
TEE – PLAN
N.T.S.



VERTICAL BEND – ELEVATION
N.T.S.



HORIZONTAL BEND – PLAN
N.T.S.



GATE VALVE – ELEVATION
N.T.S.

NOTES:

1. POLYETHYLENE WRAP IS TO BE PLACED AROUND THE ENTIRE FITTING, AND SECURED IN PLACE WITH POLYETHYLENE TAPE. PROVIDE SUFFICIENT SLACK SO THAT POLYETHYLENE WRAP IS NOT PUNCTURED DURING BACKFILL AND DOES NOT ENTRAP AIR. POLYETHYLENE WRAP IS NOT TO BE INSTALLED WITHIN 6 INCHES OF VALVE OPERATING NUT ON VALVES.
2. ALL FITTINGS TO BE POLYETHYLENE WRAPPED PRIOR TO BEDDING AND CONCRETE BLOCK PLACEMENT.
3. POLYETHYLENE WRAP IS TO BE EXTENDED A MINIMUM OF 12" PAST THE FITTING ON EACH LEG AND SECURED TO THE PIPE (OR POLYWRAP IF DIP) WITH AT LEAST TWO CIRCUMFERENTIAL WRAPS OF POLYETHYLENE TAPE.

I:\PUBLIC\ENGINEERING\CURRENT ECWA DETAILS\SD39_POLYWRAPPING_FITTINGS

ERIE COUNTY WATER AUTHORITY BUFFALO, NEW YORK	STANDARD DETAIL POLYWRAPPING CAST/DUCTILE IRON FITTINGS	DWG. NO. SD39A	
		DATE 3/18	REVISED 12/18

Approved By:

STATE OF NEW YORK
LEONARD F. KOWALSKI
084003
LICENSED PROFESSIONAL ENGINEER
EXCELSIOR

ERIE COUNTY WATER AUTHORITY
3030 UNION RD.
CHEEKTOWAGA NY, 14227

Project Name

ANDREWS AVENUE
WATERMAIN RELOCATION
ECWA PN202200066

TOWN OF CHEEKTOWAGA
ERIE COUNTY - NEW YORK

Name:
MISCELLANOUS DETAILS

Date:
MARCH 2022

Scale:
AS SHOWN

Drawn/Revised By:
WWW

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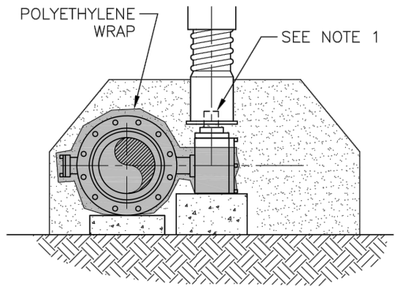
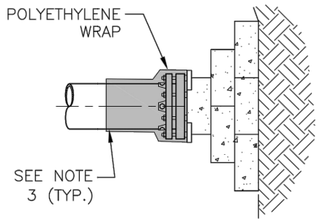
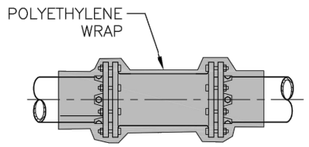


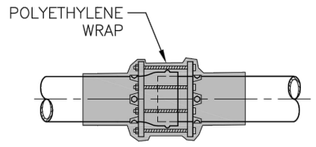
BUTTERFLY VALVE – ELEVATION
N.T.S.



END CAP / PLUG
N.T.S.



SOLID SLEEVE OR RESTRAINED COUPLING
N.T.S.



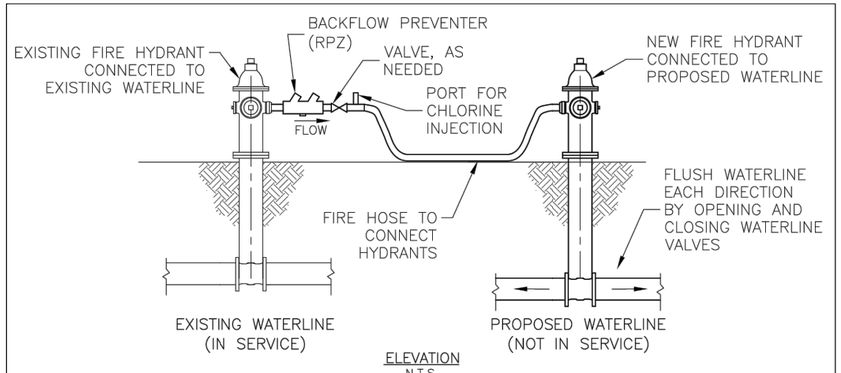
EXTERNAL JOINT RESTRAINT
N.T.S.

NOTES:

1. POLYETHYLENE WRAP IS TO BE PLACED AROUND THE ENTIRE FITTING, AND SECURED IN PLACE WITH POLYETHYLENE TAPE. PROVIDE SUFFICIENT SLACK SO THAT POLYETHYLENE WRAP IS NOT PUNCTURED DURING BACKFILL AND DOES NOT ENTRAP AIR. POLYETHYLENE WRAP IS NOT TO BE INSTALLED WITHIN 6 INCHES OF VALVE OPERATING NUT ON VALVES.
2. ALL FITTINGS TO BE POLYETHYLENE WRAPPED PRIOR TO BEDDING AND CONCRETE BLOCK PLACEMENT.
3. POLYETHYLENE WRAP IS TO BE EXTENDED A MINIMUM OF 12" PAST THE FITTING ON EACH LEG AND SECURED TO THE PIPE (OR POLYWRAP IF DIP) WITH AT LEAST TWO CIRCUMFERENTIAL WRAPS OF POLYETHYLENE TAPE.

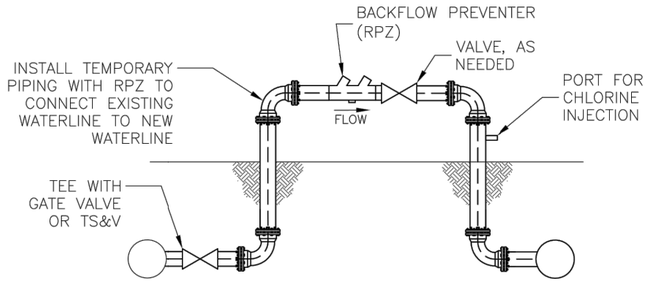
I:\PUBLIC\ENGINEERING\CURRENT ECWA DETAILS\SD39_POLYWRAPPING_FITTINGS

ERIE COUNTY WATER AUTHORITY BUFFALO, NEW YORK	STANDARD DETAIL POLYWRAPPING CAST/DUCTILE IRON FITTINGS	DWG. NO. SD39B
		DATE 12/18 / REVISED



ELEVATION
N.T.S.

METHOD 1 – CONNECT EXISTING HYDRANT TO PROPOSED HYDRANT



ELEVATION
N.T.S.

METHOD 2 – SERVICE TAP, TAPPING SLEEVE AND VALVE (TS&V), OR INTERCONNECTION

NOTES:

1. THE PURPOSE OF THIS DETAIL IS TO DEPICT ACCEPTABLE METHODS OF CONNECTING EXISTING WATERLINES TO PROPOSED WATERLINES FOR FILLING, FLUSHING, AND TESTING PROCEDURES IF 2–INCH COPPER OR POLYETHYLENE TUBING IS NOT USED TO BYPASS A VALVE. OTHER METHODS REQUIRE SUBMITTAL AND APPROVAL BY THE AUTHORITY PRIOR TO USE.
2. FIRE HOSES, TEMPORARY PIPING, AND BACKFLOW PREVENTERS SHALL NOT ENCROACH INTO ROADWAYS, DRIVEWAYS, OR SIDEWALK AREAS WITHOUT PROVIDING PROPER MAINTENANCE AND PROTECTION OF TRAFFIC MEASURES.

I:\PUBLIC\ENGINEERING\CURRENT ECWA DETAILS\SD44_SOURCE_WATER_CONNECTIONS SWD

ERIE COUNTY WATER AUTHORITY BUFFALO, NEW YORK	STANDARD DETAIL SOURCE WATER CONNECTIONS	DWG. NO. SD44
		DATE 10/20 / REVISED

Approved By:

STATE OF NEW YORK
LEONARD F. KOWALSKI
084003
LICENSED PROFESSIONAL ENGINEER

ERIE COUNTY WATER AUTHORITY
3030 UNION RD.
CHEEKTOWAGA NY, 14227

Project Name

ANDREWS AVENUE
WATERMAIN RELOCATION
ECWA PN202200066

TOWN OF CHEEKTOWAGA
ERIE COUNTY - NEW YORK

Name: MISCELLANOUS DETAILS

Date: MARCH 2022

Scale: AS SHOWN

Drawn/Revised By: WWW

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File Name: 202200066 - ANDREWS DESIGN

TECHNICAL SPECIFICATIONS

SECTION 01100

SUMMARY OF WORK

PART 1 - GENERAL

1.01 LOCATION AND SCOPE OF WORK

A. The Work consists of watermain replacements/improvements which includes but is not limited to the installation of varying sized watermains, valves, hydrants, interconnections, trenchless pipeline installation (augur bore or horizontal directional drilling), roadway/railroad/creek crossings, service reconnections/installations, testing and disinfection, and restoration.

B. The Work is to be performed in the entire Erie County Water Authority's franchised area and all water districts that the Authority operates under a leased managed contract. The work is located in Erie County and includes the towns of Alden, Amherst, Aurora, Boston, Cheektowaga, Clarence, Concord, Eden, Evans, Hamburg, Lancaster, Marilla, Newstead, Orchard Park, and West Seneca; the Villages of Blasdell, Depew, Hamburg, Orchard Park, Lancaster, Sloan, and Williamsville; and the Cities of Lackawanna and Tonawanda.

C. The summary of the Work described in the Section 01100 is an overall summary of the responsibilities of the CONTRACTOR and his relation to the OWNER. It does not supersede the specific requirements of the other Contract Documents.

1.02 CONTRACTS

A. The Work shall be constructed under one prime contract.

1.03 WORK BY OTHERS

A. Work by OWNER:

1. The Authority will operate all utility water system valves and hydrants of existing watermains and of newly installed watermains once placed into service.

1.04 OWNER FURNISHED PRODUCTS

A. Products furnished by OWNER are as follows:

1. All watermain piping (excluding HDPE piping), fittings, valves, tapping valves, tapping sleeves, tees, fittings, fire hydrants, valve boxes, couplings, retainer glands, tie rods, service tubing, corporation stops, curb stops, curb boxes, service saddles, polyethylene tubing, polyethylene

encasement for ductile iron pipe and fittings, magnetic tape (excluding tracer wire), and other related appurtenances or accessories.

B. CONTRACTOR shall be responsible to obtain all OWNER furnished materials from the Erie County Water Authority Service Center, 3030 Union Road, Cheektowaga, New York, between the hours of 9:00 a.m. and 3:00 p.m.

C. Materials shall not be available any sooner than 48 hours before the Work is scheduled to be performed.

D. The CONTRACTOR shall inspect the materials and give written acceptance of the same on the materials requisition slip of the Authority. The CONTRACTOR will be responsible for all material until installed in the finished work and accepted by the Authority. Upon completion of the work, he shall return all surplus to the place of origin where it shall be received, inspected, and credit issued to him for the returned material. Any loss of material which has not been returned or is in unsatisfactory condition shall be charged to the CONTRACTOR. Short lengths of pipe less than thirty (30) inches in length shall not be returned for credit. All jointing material not used on the job and not returned shall be charged against the CONTRACTOR at the cost per unit.

1.05 CONTRACTOR FURNISHED PRODUCTS

A. Products to be furnished by CONTRACTOR are as follows:

1. HDPE piping, precast chambers/vaults, concrete, concrete blocking, select backfill, rip-rap backfill, bedding, temporary construction, testing needs, casing pipe and accessories, restoration items (temporary and permanent), and all other items necessary to complete the Work including any temporary construction work.

2. Tapping equipment, boring equipment, and all other equipment necessary to install watermains, services, and appurtenances under this Contract.

1.06 SEQUENCE OF WORK

A. General

1. The Work generally shall be constructed without disruption to the normal operation of the Authority, except as noted in Section 01311, and 01731, and as otherwise approved by the OWNER.

2. It is hereby understood that Time is of Essence in performing all work, but especially in the time that service is interrupted to the customer. Disruption of water service to customers shall be minimized and shall not exceed four hours in duration for service installations.

3. Work performed in the vicinity of existing restaurants, police stations, health care facilities, municipal buildings, places of worship, and schools must be performed in the least disruptive time (off hours) and must be coordinated with the affected establishment and the ENGINEER prior to work being performed.

4. Prior to any interconnection or abandonment, the CONTRACTOR shall schedule a water shut-down with the Erie County Water Authority through the ENGINEER.

B. Customer Notification

The CONTRACTOR is responsible to notify all customers 48 hours in advance of when work is to take place at their address. The Authority shall also be notified 72 hours in advance in accordance with Sections 01731 and 15051. The CONTRACTOR is required to complete a Customer Notification Form conforming to the requirements of Erie County Water Authority.

C. Construct the Work in the following sequence:

1. Complete and submit shop drawings to ENGINEER, as required.

2. Complete and submit Maintenance and Protection of Traffic plan to ENGINEER, as defined under Section 01550.

3. Obtain all necessary permits and submit copies to the ENGINEER.

4. The CONTRACTOR is advised that the WORK shall follow the sequence as specified or as required. Work in a specific area shall be performed in a manner such that once started, progress shall continue to a point where the testing, disinfection, acceptance by Erie County Water Authority or Heath Department, and general cleanup has been completed prior to starting work on another area.

5. The CONTRACTOR shall dig test pits as shown on the plans or required to verify pipe outside diameter, depth, condition, and location of joints. Test pits shall be backfilled, compacted, and temporary restoration (including pavement) shall be installed prior to applicable Work being performed on various mains.

6. CONTRACTOR and/or OWNER shall order any “special” fittings/materials that take extensive time to acquire.

D. Weekly Status Reports:

1. CONTRACTOR shall submit weekly reports, in a form acceptable to ENGINEER.

2. Reports shall be submitted to the ENGINEER by 9:00 a.m. every Monday during the months when Work is being performed.

3. Unsatisfactory Work that needs to be redone must be identified on a separate listing to be included with the weekly report.

4. Record Documents shall be provided on a weekly basis complying to Section 01780 and submitted with the weekly reports.

5. Service Record Forms:

   The CONTRACTOR shall be required to record all dimensions of new services and/or service replacements on a form provided by the Authority or conforming to the Authority's requirements.

1.07 CONTRACTOR'S USE OF PREMISES

A. CONTRACTOR'S use of the premises shall be confined to the areas shown.

B. The full use of the premises for storage, the operations of workmen and all other required construction activities will not be available to the CONTRACTOR.

C. CONTRACTOR must share use of the premises with the OWNER and other contractors specified in Article 1.03.

D. CONTRACTOR shall:

   1. Assume full responsibility for protection and safekeeping of products stored on or off premises.

   2. Move stored products that interfere with the operations of OWNER or other contractor.

   3. Obtain and pay for all additional storage or work areas required for his operations.

   4. Obtain and pay for all permits and satisfy all permit requirements.

   5. Comply with all requirements defined in other specification sections.

E. Limits on CONTRACTOR'S use of site are:

   1. OWNER will designate the area available for field offices.

F. See General Conditions for additional requirements.

G. CONTRACTOR shall minimize disturbance of the existing conditions of lawn, pavement, sidewalk, driveway, etc. during the course of the Work.

H. The CONTRACTOR shall be responsible to verify the location of the right-of-way line for all watermain replacements/improvements. Under no circumstances

shall curb box be installed in a sidewalk. If the right-of-way line falls within the sidewalk, the curb box shall be installed outside of the sidewalk. Any curb box installed in a sidewalk shall be moved and sidewalk replaced by the CONTRACTOR at his cost.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01140

USE OF OWNER'S FACILITIES

PART 1 - GENERAL

1.01 DESCRIPTION

A. CONTRACTOR may use existing facilities or equipment in the new Work for construction purposes only if the OWNER'S written permission is obtained.

B. Restore existing facilities and equipment used for temporary purposes to original condition in a manner satisfactory to OWNER.

C. CONTRACTOR shall assume full responsibility for any damage that may result to existing or new facilities or equipment used for construction purposes and shall repair or replace any damaged facilities or equipment at CONTRACTOR'S cost.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01210

ALLOWANCES

PART 1 - GENERAL

1.01 SCOPE

A. This Section includes administrative and procedural requirements governing the following types of allowances:
   1. Cash allowances.
   2. Contingency allowances.

B. Authorization of Allowances:
   1. Work that will be done and paid under an allowance will be authorized in OWNER'S written instruction to CONTRACTOR.
   2. Do not provide Work under an allowance without written authorization of OWNER.

1.02 CASH ALLOWANCES

A. Cash allowances are stipulated amounts for purchase of products, systems, or services. In addition to this Section, refer to General Conditions, as may be modified by the Supplementary Conditions; and individual Specification Sections for CONTRACTOR'S costs to be covered by allowances, and CONTRACTOR'S costs, including overhead and profit, to be included elsewhere in the Contract Price.

B. At earliest practical date after Notice to Proceed, advise ENGINEER of date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

C. Consult with ENGINEER in selecting suppliers and obtain proposals for price and time from selected suppliers. Submit proposals to ENGINEER along with recommendations relevant to furnishing and installing products covered in the allowance.

D. Purchase products or systems from suppliers selected by ENGINEER.

E. Submit invoices or delivery slips to show actual cost and quantity of products or systems delivered to Site and used in fulfilling each allowance.

F. Properly dispose of unused products and systems purchased under cash allowance.

G. For each allowance, submit to ENGINEER a Change Order proposal to adjust Contract Price for difference between specified allowance amount and actual cost.

Prepare Change Order proposal in accordance with General Conditions as may be modified by the Supplementary Conditions, except that payment within limit of a cash allowance shall exclude cost of bond and insurance premiums. No subcontractor markup is allowed under allowance work.

1.03 CONTINGENCY ALLOWANCE

A. Contingency allowances are stipulated amounts available as reserve for sole use by OWNER to cover unanticipated costs.

B. When authorization of Work under contingency allowance is contemplated by OWNER for a defined scope, submit Change Order proposal to ENGINEER. Prepare Change Order proposal in accordance with the General Conditions as may be modified by the Supplementary Conditions, except that payments within limit of contingency allowance shall exclude cost of bond and insurance premiums.

C. For each allowance, submit to ENGINEER a Change Order proposal to adjust Contract Price for difference between specified allowance amount and actual cost. Prepare Change Order in accordance with General Conditions as may be modified by the Supplementary Conditions, except that payment within limit of a cash allowance shall exclude cost of bond and insurance premiums.

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 SCHEDULE OF ALLOWANCES

A. Contingency Allowances: Include a stipulated contingency allowance of $150,000.00 for Bid Item 7, Contingency Allowance, for use in accordance with the OWNER'S instruction to perform miscellaneous work.

B. Maintenance and Protection of Traffic (State and County Roads) Allowances: Include a stipulated cash allowance of $50,000 for Bid Item 14A2, Maintenance and Protection of Traffic (State and County Roads) Allowances as defined in Section 01270, Measurement and Payment. Work zone safety equipment rental and setup work will be by US Traffic Control, Inc or by an approved equal.

END OF SECTION

SECTION 01270

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A. The items listed below beginning with Article 1.05, refer to and are the same pay items listed in the Bid Form. They constitute all of the pay items for the completion of the Work. No direct or separate payment will be made for providing miscellaneous temporary or accessory works, plant, services, ENGINEER'S and/or CONTRACTOR'S field offices, layout surveys, job signs, sanitary requirements, permits, testing, safety devices, shop drawings and samples, approval and record drawings, water supplies, power, maintaining traffic, removal of waste, watchmen, bonds, insurance, test pits and all other requirements of the General Conditions, Supplementary Conditions, and the General Requirements. Compensation for all such services, things and materials shall be included in the prices stipulated for the lump sum and unit price pay items listed herein.

B. The lump sum and unit bid prices will be deemed to include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR'S overhead and profit for each separately identified item.

C. The CONTRACTOR shall furnish all labor, materials, tools, equipment, services, and all appurtenances necessary to perform all work required, at the unit or lump sum prices for the items listed in the Bidder's Proposal. Each bid item shall include all costs to perform all work to complete each item. Work shall include, but is not necessarily limited to clearing and grubbing, earth excavation, rock excavation, disposal of excess excavated material, handling of all water, dewatering, earth backfill, select backfill, pipe bedding and encasement, concrete cradle, concrete encasement, concrete cover, concrete anchor collars, concrete blocking, piping, service tubing and accessories, saddles, curb stops, curb boxes, bends, reducers, tees, valves, mechanical thrust restraints valve boxes, hydrants, and all other fittings, traffic control, permits, test pits, replacement of sidewalks, driveways, and pavements, curbs, underdrains, drainage, curb receivers, ditches, rip rap, driveway culverts, headwalls, temporary resurfacing, all final restoration, connections to existing watermains, testing, disinfection, all abandonments, and maintaining water service to customers.

D. Each of the bid items shall also include the cost required in supporting and protecting existing utilities while working under, over, or alongside or near the utility. Also included, is the protection of overhead telephone, cable, electric power or other lines and the supporting of poles, if required.
   1. The utilities likely to be encountered include:
      a. Storm and sanitary sewers.

b. Gas, water, electric, telephone, fiber optic, and cable TV house service connections.
c. Overhead and underground telephone, fiber optic, cable TV and electric power lines.
d. Other watermains.

2. The cost of repairing any damage to the various utilities done during the installation of the work shall be included in the various bid items.

E. Where fixed minimum unit prices are called for under an item heading, the bidder shall include a price not less than the stated minimum. Bidder's Proposals received which include a unit price less than the stated minimum shall be adjusted to meet the minimum unit price.

1.02 ENGINEER'S ESTIMATE OF QUANTITIES

A. ENGINEER'S estimated quantities for unit price pay items, as listed in the Bid Form, are approximate only and are included solely for the purpose of comparison of Bids. OWNER does not expressly or by implication agree that the nature of the materials encountered or the actual quantities of material encountered or required will correspond therewith and reserves the right to increase or decrease any quantity or to eliminate any quantity as OWNER may deem necessary. Except as provided in Article 1.03, CONTRACTOR or OWNER will not be entitled to any adjustment in a unit bid price as a result of any change in an estimated quantity and agrees to accept the aforesaid unit bid prices as complete and total compensation for any additions caused by changes or alterations in the Work ordered by OWNER.

1.03 ADJUSTMENT OF UNIT PRICES FOR INCREASE OR DECREASE OF ESTIMATED QUANTITIES

A. For bid items paid for on a unit price basis, increases or decreases in the quantity of an item of Work will be determined by comparing the total payable quantity of Work with ENGINEER'S estimated quantity as shown in the Bid Form. Increase or decreases will only be considered if the Schedule of Values as required in Section 01290 has been prepared, submitted, and approved.

B. If the total payable quantity of any unit price item of Work, which has an as-bid computed total value of five percent or more of the sum of the as-bid computed total values of all items bid, varies from ENGINEER'S estimate of quantity therefore by more than 50 percent, the unit price of that item will be a subject of review by ENGINEER. If warranted, an equitable adjustment will be made by means of a Change Order to credit OWNER with any reduction in cost or to compensate CONTRACTOR for any increase in cost resulting from the change in quantity. This review of the adjustment will be made at a time ENGINEER deems reasonable and proper.

C. Payment for any unit price item of Work, which has an as-bid computed total value of less than five percent of the sum of the as-bid computed total values of all items bid, will be made at the unit price bid regardless of an increase or decrease in quantity.

1.04 RELATED PROVISIONS

A. Payments to CONTRACTOR: Refer to General Conditions and Agreement.

B. Changes in Contract Price: General Conditions.

C. Schedule of Values: Section 01290.

1.05 BID ITEMS

A. ITEM 1 - WATERMAIN

1. PVC and DIP Watermain (Items 1A and 1B)

a. Work Included:

1) This item includes all labor, materials, equipment, and incidentals required to install PVC or DIP watermain of the size, class, depth and materials shown on the drawings and specified herein, except that specifically included under other items of the Contract. Earth excavation, and disposal of excess excavated material required for this project are included in this item.

2) PVC and DIP materials shall be furnished by OWNER. This item also includes hauling, storing and distributing all materials by CONTRACTOR from OWNER'S Service Center to the site of work.

3) This item includes pipe bedding, thrust blocks, temporary and permanent blocking, magnetic pipe marking tape, backfilling, compaction, sampling points, clearing and grubbing (to widths 15-feet or less), topsoil stripping, tree trimming as required for equipment access to perform work adjacent to existing trees, tree removal and disposal, dewatering, shoring, sheeting, tree boring (including casing pipe, annular fill stone, skids and spacers), and all other materials and requirements not specifically defined in other bid items.

4) This item does not include fittings, such as tees, elbows, reducer, bevels, and shorts.

5) This item does not include polyethylene encasement for ductile iron pipe and fittings, which is included for payment under Item 6.

6) This item includes temporary support of nearby utility poles.

7) This item does not include select backfill, which is included for payment under Item 8A.

8) This item includes furnishing and installing temporary sample points. Also included is the removal of the temporary sample points after completion of test and replacing the corporation stop with plug.

9) This item includes installation of watermain at all depths where shown on the Drawings.

10) This item includes all excavation required and saw-cutting of existing streets, driveways, and sidewalks to complete the watermain installation.

11) This includes all backfilling and maintenance of such backfill until temporary or permanent restoration is accomplished.

12) Temporary and permanent restoration of sidewalk, driveways, pavement, and landscaping, which are included for payment under Item 13.

13) This item includes all items and work necessary for the proper maintenance and protection of traffic of City, Town, and Village roads as defined in Section 01550. Maintenance and protection of traffic for County and State roads will be paid under Item 14B2.

b. Measurement:

1) The quantity of watermain in place paid for under this item shall be the number of linear feet of each size installed within the limits shown, specified, or directed. The lengths shall be measured along the centerline of the pipe without deduction for line valves and or fittings. The depth of pipeline shall be measured from existing grade to the top of pipe. A depth change must be constant for greater than 10-feet in length otherwise the installation cost will be paid at the lower installation cost.

c. Payment:

1) The unit prices bid per linear foot shall be full compensation for furnishing all labor, materials, equipment, and incidentals necessary to install and place into service the watermain as shown, specified, or directed.

2) The subdivisions of this item are:

1A 4-inch to 8-inch Watermain (PVC or DIP)
- 1A1 6-feet or less of cover
- 1A2 Greater than 6-feet of cover

1B 10-inch to 12-inch Watermain (PVC or DIP)
- 1B1 6-feet or less of cover
- 1B2 Greater than 6-feet of cover

2. HDPE Watermain – **HDD USE ONLY** (Item 1C)

a. Work Included:

1) This item includes all labor, materials, equipment, and incidentals required to furnish, stringing, and fusion of HDPE watermain of the size, class, shown on the drawings and specified herein, except that specifically included under other items of the Contract. Earth excavation, and disposal of excess excavated material required for this project are included in this item.

2) HDPE materials shall be furnished by CONTRACTOR

3) This item includes pipe rollers, anchor blocks, temporary and permanent blocking, tracer wire, backfilling, compaction, sampling points, clearing and grubbing (to widths 15-feet or less), topsoil stripping, tree trimming as required for equipment access to perform work adjacent to existing trees, tree removal and disposal, dewatering, and all other materials and requirements not specifically defined in other bid items.

4) This item includes fittings, such as transition couplings, wall anchors, and reducer.

5) This item does not include polyethylene encasement for ductile iron fittings, which is included for payment under Item 6.

6) This item includes temporary support of nearby utility poles.

7) This item does not include select backfill, which is included for payment under Item 8A.

8) This item includes furnishing and installing temporary sample points. Also included is the removal of the temporary sample points after completion of test and replacing the corporation stop with plug.

9) This item includes all pipe preparation required for HDD pull back.

10) This item includes all excavation required and saw-cutting of existing streets, driveways, and sidewalks to complete the HDD watermain installation.

11) This includes all backfilling and maintenance of such backfill until temporary or permanent restoration is accomplished.

12) Temporary and permanent restoration of sidewalk, driveways, pavement, and landscaping, which are included for payment under Item 13.

13) This item includes all items and work necessary for the proper maintenance and protection of traffic of City, Town, and Village roads as defined in Section 01550.

Maintenance and protection of traffic for County and State roads will be paid under Item 14B2.

b. Measurement:

1) The quantity of watermain in place paid for under this item shall be the number of linear feet of each size installed within the limits shown, specified, or directed. The lengths shall be measured along the centerline of the pipe without deduction for line valves and or fittings.

c. Payment:

1) The unit prices bid per linear foot shall be full compensation for furnishing all labor, materials, equipment, and incidentals necessary to install and place into service the watermain as shown, specified, or directed.

2) The subdivisions of this item are:

1C High Density Polyethylene (HDPE) – **HDD USE ONLY**

1C1 10-inch DR9 DIPS HDPE

1C2 12-inch DR9 DIPS HDPE

1C3 16-inch DR9 DIPS HDPE

B. ITEM 2 - VALVES

1. Work Included:

a. This item includes all labor, material, equipment and incidentals required to install, flush, test, disinfect, and place into service the valves and appurtenances as shown, specified, or directed.

b. Valves and appurtenance materials shall be furnished by OWNER. This item also includes hauling, storing and distributing all materials by CONTRACTOR from OWNER'S Service Center to the site of work.

c. Valves for hydrant assemblies are not included herein, but included for payment under Item 4, Fire Hydrants.

d. This item includes all excavation required and the furnishing and installing of earth backfill, bedding stone, and concrete blocks to complete the valve or appurtenances installation.

e. For air release valves with or without concrete chambers, this item includes furnishing and installing all materials and work necessary to install the components as shown on the Drawings.

f. For existing valve abandonment, this item includes the removal of existing valve box and closure of valve as shown on the Drawings.

g. This item does not include select backfill, which is included for payment under Item 8A.

h. This item includes installation or abandonment of valves at all depths where shown on the Drawings.

i. This item includes temporary support of nearby utility poles.

j. This item includes all excavation required and saw-cutting of existing streets, driveways, and sidewalks to complete the valve installation or abandonment.

k. This includes all backfilling and maintenance of such backfill until temporary or permanent restoration is accomplished.

l. Temporary and permanent restoration of sidewalk, driveways, pavement, and landscaping, which are included for payment under Item 13.

m. This item includes all items and work necessary for the proper maintenance and protection of traffic of City, Town, and Village roads as defined in Section 01550. Maintenance and protection of traffic for County and State roads will be paid under Item 14B2.

2. Measurement:

a. The quantity to be paid for under this item shall be the actual number of valves of various types and sizes installed as shown, specified, or directed.

3. Payment:

a. The unit prices bid for this item shall be full compensation for furnishing all labor, materials, equipment, and incidentals to install, and place into service the valves of various types and sizes installed as shown, specified, or directed.

b. The subdivisions of this item are:

2A Gate Valve
- 2A1 4-inch to 8-inch
- 2A2 10-inch to 12-inch

2B Butterfly Valve
- 2B1 12-inch

2C Air Release Valves
- 2C1 Air Release Valve with Concrete Chamber
- 2C2 Manually Operated Air Release Assembly

2D Existing Valve Abandonment
- 2D1 Existing Valve Abandonment – Complete

C. ITEM 3 – EXISTING WATERMAIN CONNECTIONS (INTERCONNECTIONS)

1. Work Included:

a. This item includes all labor, materials, equipment, and incidentals required to install, disinfect and place into service the interconnections between the proposed system and the existing system as shown, specified, or directed.

b. All materials to complete interconnections shall be furnished by OWNER. This item also includes hauling, storing and distributing all materials by CONTRACTOR from OWNER'S Service Center to the site of work.

c. Pipe used at the interconnection shall be paid for under the watermain item for the appropriate pipe size and type.

d. This item includes all cost related to installing couplings, concrete blocking/anchor collars, removals, plugging, harnessing, dewatering, etc.

e. Tapping sleeves and valves shall include the installation of tapping sleeve and valve and all operations required to tap the main.

f. Cut in tees with valve cluster includes the cutting of existing watermain and the installation of tee, spool pieces, up to three valve, couplings, blocking, and accessories to complete the interconnection.

g. This item does not include the cutting and removal of existing asbestos watermain. The CONTRACTOR shall coordinate with ECWA for the cutting and removal of asbestos piping 48-hours prior to interconnection. The CONTRACTOR will have the existing main exposed to the limits required for the interconnection. Upon completion of cutting and removal of asbestos watermain, the CONTRACTOR will complete the interconnection and backfill as required.

h. This item also includes abandoning existing main line valves and valve boxes as shown, specified, or directed.

i. Where valves, etc., are to be removed, they shall be removed and properly stored, protected, and delivered to the Erie County Water Authority, if required and the cost shall be included herein.

j. This item includes temporary support of nearby utility poles.

k. This item does not include select backfill, which is included for payment under Item 8A.

l. This item includes interconnections at all depths where shown on the Drawings.

m. This item includes all excavation required and saw-cutting of existing streets, driveways, and sidewalks to complete the interconnection.

n. This includes all backfilling and maintenance of such backfill until temporary or permanent restoration is accomplished.

o. Temporary and permanent restoration of sidewalk, driveways, pavement, and landscaping, which are included for payment under Item 13.

p. This item includes all items and work necessary for the proper maintenance and protection of traffic of City, Town, and Village roads as defined in Section 01550. Maintenance and protection of traffic for County and State roads will be paid under Item 14B2.

q. This item includes all costs for working at night or on off-hours. Included herein is all lighting, traffic protection, etc.

r. The interconnection items include all costs to comply with permits, regulatory agencies, etc., not included in other bid items.

2. Measurement:

a. The quantity to be paid for under this item shall be for the completed interconnections as shown, specified, or directed.

3. Payment:

a. The lump sum price bid for each interconnection shall be full compensation for furnishing all labor, material equipment, and

incidentals required to furnish, install, test, disinfect and place into service the interconnection as shown, specified, or directed.

b. The subdivisions of this item are as follows:

3A Inline Connections

3A1 4-inch to 8-inch Inline Connections

3A2 10-inch to 12-inch Inline Connections

3B Tapping Sleeve and Valve

3B1 4-inch to 8-inch Tapping Sleeve and Valve – Complete

3B2 10-inch to 12-inch Tapping Sleeve and Valve – Complete

3C Cut in Tee with Valve Cluster

3C1 4-inch to 8-inch Cut in Tee with Valve Cluster – Complete

3C2 10-inch to 12-inch Cut in Tee with Valve Cluster – Complete

D. ITEM 4 - FIRE HYDRANTS

1. Work Included:

a. The new fire hydrant item includes all labor, materials, equipment, and incidentals required to install and place into service new fire hydrants and appurtenances as shown, specified, or directed.

b. Hydrant assembly, valves, and appurtenance materials shall be furnished by OWNER. This item also includes hauling, storing and distributing all materials by CONTRACTOR from OWNER'S Service Center to the site of work.

c. The new fire hydrant item begins at the mainline tee and will include all excavation, backfill, washed No. 1 stone for weep hole drainage, piping, valves, blocking, and hydrant assembly. The mainline tee is included under item 5.

d. This item does not include polyethylene encasement for ductile iron fittings, which is included for payment under Item 6.

e. The fire hydrant abandonment item includes all labor, materials, equipment, and incidentals to remove existing fire hydrants and hydrant valve boxes as shown, specified, or directed.

f. This item shall include field painting of hydrants after installation, and the installation of vertical extensions where required.

g. This item includes temporary support of nearby utility poles.

h. This item does not include select backfill, which is included for payment under Item 8A.

i. This item includes hydrants at all depths where shown on the Drawings.

j. This item includes all excavation required and saw-cutting of existing streets, driveways, and sidewalks to complete the interconnection.

k. This includes all backfilling and maintenance of such backfill until temporary or permanent restoration is accomplished.

l. Temporary and permanent restoration of sidewalk, driveways, pavement, and landscaping, which are included for payment under Item 13.

m. This item includes all items and work necessary for the proper maintenance and protection of traffic of City, Town, and Village roads as defined in Section 01550. Maintenance and protection of traffic for County and State roads will be paid under Item 14B2.

n. This item includes all required culverts as shown on drawings or specified herein.

o. This item includes the removal and return of all abandoned hydrants to the Erie County Water Authority as directed. This includes calling 24 hours in advance to schedule the delivery, careful handling to prevent damage to hydrants, proper trucking to the delivery site, and unloading of hydrants at the designated location at the Erie County Water Authority.

p. This item includes the removal of hydrant markers from existing hydrants and reinstallation of these markers on new or relocated hydrants.

2. Measurement:

a. The quantity to be paid for under this item shall be the actual number of fire hydrants installed, removed, or relocated and reconnected as shown, specified, or directed.

3. Payment:

a. The unit price bid per this item shall be full compensation for all labor, materials, equipment, and incidentals required to furnish, install, disinfect, test, and place into service the fire hydrants including gate valves for fire hydrant shut-off; to remove, relocate, reconnect, test, and place into service existing fire hydrants; and to abandon existing fire hydrants (including capping and plugging) as shown, specified, or directed.

b. The subdivisions of this item are:

4A New Fire Hydrant Assemblies

4A1 New Fire Hydrant Assemblies

4B Existing Fire Hydrant Abandonment

4B1 Existing Fire Hydrant Abandonment

E. ITEM 5 – DUCTILE IRON (DI) FITTINGS

1. Work Included:

a. This item includes all labor, materials, equipment, and incidentals required to install, disinfect and place into service the ductile iron fitting. All fittings shall be installed with polyethylene encasement and shall be installed with a concrete thrust block in addition to the required restraining devices on each side of the fitting.

b. Fittings, restraints, and appurtenance materials shall be furnished by OWNER. This item also includes hauling, storing and

distributing all materials by CONTRACTOR from OWNER'S Service Center to the site of work.

c. This item includes all gaskets, glands, restraining devices at fittings, associated pipe harnessing included on both sides of the fitting along pipeline for distances shown, thrust blocks, bolts, nuts, and other appurtenances required to install the fittings.

d. The fitting and piping shall be harnessed for the lengths as shown on the limits shown on the harnessing table on drawings, specified herein, or ordered by the Engineer.

e. For joint restraints on existing watermains all labor, materials, equipment, and incidentals required to excavate existing pipeline and install joint restraints to the limits shown on the harnessing table on drawings, specified herein, or ordered by the Engineer.

f. This item does not include polyethylene encasement for ductile iron fittings, which is included for payment under Item 6.

g. This item includes temporary support of nearby utility poles.

h. This item does not include select backfill, which is included for payment under Item 8A.

i. This item includes fittings and joint restraints at all depths where shown on the Drawings.

j. This item includes all excavation required and saw-cutting of existing streets, driveways, and sidewalks to complete the interconnection.

k. This includes all backfilling and maintenance of such backfill until temporary or permanent restoration is accomplished.

l. Temporary and permanent restoration of sidewalk, driveways, pavement, and landscaping, which are included for payment under Item 13.

m. This item includes all items and work necessary for the proper maintenance and protection of traffic of City, Town, and Village roads as defined in Section 01550. Maintenance and protection of traffic for County and State roads will be paid under Item 14B2.

2. Measurement:

a. The quantity to be paid for installing fittings shall be the actual number of fittings installed with all required joint restraints to the limits specified, glands, bolts, gaskets, etc. as shown, specified, or directed.

b. The quantity to be paid for installing joint restraints on existing watermains shall be the actual number of joints restrained as shown, specified, or directed.

3. Payment:

a. The unit price bid for each fitting and joint restraints shall be full compensation for furnishing all labor, material equipment, and incidentals required to furnish, install, test, disinfect and place into service the interconnection as shown, specified, or directed.

b. The unit price bid for each fitting and joint restraints installed on existing watermain shall be full compensation for all labor, materials, equipment and incidentals install, test, disinfect and place fittings into service as shown, specified, or directed.

c. The subdivisions of this item are:

5A Ductile Iron (DI) Fittings

5A1 4-inch to 8-inch DI Fitting with joint restraints

5A2 10-inch to 12-inch DI Fitting with joint restraints

5A3 Joint Restraints on 4-inch to 8-inch Existing Watermain

5A3 Joint Restraints on 10-inch to 12-inch Existing Watermain

F. ITEM 6 – POLYETHYLENE ENCASEMENT

1. Work Included:

a. This work shall consist of furnishing all labor, materials, equipment and incidentals for the installation of polyethylene encasement on all new ductile iron pipe, fittings, and restraints as shown, specified and directed.

b. Polyethylene encasement materials shall be furnished by OWNER. This item also includes hauling, storing and distributing all materials by CONTRACTOR from OWNER'S Service Center to the site of work.

c. This item does not include the installation of pipe, fittings, or restraints, which are included under various other payment items.

d. This item includes polyethylene encasements at all depths where shown on the Drawings.

e. This item does not include temporary support of nearby utility poles.

f. This item does not include select backfill, which is included for payment under Item 8A.

g. This item does not include excavation required; saw-cutting of existing streets, driveways, and sidewalks; and restoration for the installation of polyethylene encasement.

h. This item does not include any items and work necessary for the proper maintenance and protection of traffic for the installation of polyethylene encasement.

2. Measurement:

a. The quantity to be paid for under this item shall be the amount of polyethylene encasement installed per linear foot on ductile iron pipe, fittings, or restraints as shown, specified or directed.

3. Payment:

a. The unit price bid per linear foot shall be full compensation for furnishing all labor, materials, equipment and incidentals required to install polyethylene encasement as shown, specified or directed.

b. The subdivisions of this item are:

6A Polyethylene Encasement

6A1 Polyethylene Encasement for DI Pipe and Fittings

G. ITEM 7 – ROCK EXCAVATION, TEST PIT EXCAVATION AND BACKFILL, AND EXTRA EXCAVATION AND BACKFILL

2. Rock Excavation (Item 7A)

a. Work Included:

1) This work shall consist of furnishing all labor, materials, equipment and incidentals to remove rock by such methods as drilling, jacking, hammering and mechanical excavation to the lines and grades as shown, specified and directed.

2) This item includes disposal of rock removed from the trench, which is unsuitable for backfill.

3) Rock that can be removed by normal excavation equipment shall not be measured for rock excavation.

b. Measurement:

1) The quantity to be paid for under this item shall be the amount of rock in cubic yards removed from within the pay limits as shown, specified or directed.

2) The rock shall be uncovered prior to removal in sections acceptable to the ENGINEER, so that it may be measured prior to removal.

c. Payment:

1) The unit price bid per cubic yard shall be full compensation for furnishing all labor, materials, equipment and incidentals required to remove rock as shown, specified or directed.

2) The subdivisions of this item are:

7A Excavation

7A1 Rock Excavation

3. Test Pit Excavation (Item 7B)

a. Work Included:

1) This work shall include all labor, materials, equipment and incidentals required to perform test pit excavations (and backfill same) at the locations shown, specified, or directed unless specially included for payment elsewhere.

2) This item includes furnishing and installing temporary restoration for all disturbed streets, driveways, and sidewalks, including select backfill and temporary pavement to maintain pedestrian and vehicular traffic.

3) Permanent restoration is included for payment elsewhere.

4) The cost for a test pit for service replacements/installations are not included in this bid item since the costs for any test pits required at those locations shall be included in the service replacement/installation bid item.

5) This item includes all items and work necessary for the proper maintenance and protection of traffic of City, Town, and Village roads as defined in Section 01550.

Maintenance and protection of traffic for County and State roads will be paid under Item 14B2.

b. Measurement:

1) Test pit excavations which shall be paid for under this item shall be the actual number of test pit excavations performed as shown, specified, or directed.

2) The test pit shall be five (5) feet by five (5) feet by all depths.

c. Payment:

1) The unit price bid for test pit excavation and backfill shall be full compensation for all labor, materials, equipment and incidentals necessary to perform test pit excavations and backfill as shown, specified, or directed.

2) The subdivisions of this item are:

7B Test Pit Excavation and Backfill

7B1 Test Pit Excavation and Backfill

H. ITEM 8 – SPECIAL BACKFILL

1. Work Included:

a. This item includes all labor, material sampling and testing, plant equipment, and incidentals required to furnish and install the select backfill or rip-rap backfill material as shown, specified, or directed.

b. Select backfill and rip-rap materials shall be furnished by CONTRACTOR.

c. This item does not include pipe bedding and encasement, since the cost for pipe bedding and encasement shall be included under the watermain bid items.

d. This item does not include select backfill or rip-rap backfill at water service boring/receiving pits, since the cost of backfill at these locations are included under the Water Service Connections bid item.

2. Measurement:

a. The quantity to be paid for under this item shall be the number of cubic yards of select backfill placed as shown, specified, or directed to the limits shown on the trench detail.

b. Measurement shall not be based upon loose or truck-ticket quantities.

3. Payment:

a. The unit prices bid per cubic yard for this item shall be full compensation for all labor, material, plant, sampling and testing, equipment, compaction, and incidentals necessary to furnish and install the select backfill material within the pay limits shown on the drawing as shown, specified, or directed.

b. The subdivisions of this item are:

8A Select Backfill

8A1 Select Backfill

8B Rip-Rap Backfill

8B1 Rip-Rap Backfill

I. ITEM 9 - WATER SERVICE CONNECTIONS AND BLOW-OFFS

1. Work Included:

a. This item includes all labor, equipment and incidentals required to install, test, disinfect and place into service Water Service Connections and Blow-off of the size, class, depth and materials shown on the drawings and specified herein, except that specifically included under other items of the Contract.

b. Water Service Connection and Blow-off materials shall be furnished by OWNER with the exception of polyethylene tubing which will be provided by the CONTRACTOR. This item also includes hauling, storing and distributing all materials by CONTRACTOR from OWNER'S Service Center to the site of work.

c. The work shall include all exploratory excavations, to locate the existing services, clearing and grubbing, earth backfill, tapping the main, installing saddles, installing the service corporation stops, installing type K copper or polyethylene (when approved) service piping with flared fittings (as required) and connecting the new service to the watermain by installing a new curb stop and box. Exploratory excavations to locate existing services shall not be consider test pitting and will not be paid as such.

d. When the push/drill method is used, all labor, material and equipment required to install the services, including pushing/drilling and receiving pits, shall be included in this item. No extra payment will be made if rock, boulders or other obstacles are encountered during the pushing/drilling operation or if multiple pushes/drills are necessary to install a proper service.

e. This item includes all costs for locating all underground utilities via exploratory excavations (water, sewer, gas, storm drains, electric, etc.,) working under, over, alongside, near all existing utilities and all other work required for a complete installation.

f. This item includes flushing the entire service as required and cleaning the existing meter and also demonstrating that all system components properly operate.

g. This includes all backfilling and maintenance of such backfill until temporary or permanent restoration is accomplished.

h. Temporary and permanent restoration of sidewalk, driveways, pavement, and landscaping, which are included for payment under Item 13.

i. This item includes all cost associated with performing work in accordance with the requirements of the Town, County or State agencies having jurisdiction.

j. Select backfill along the length of the service piping is included for payment elsewhere. No separate payment will be made for select

backfill for pushing/boring pits and receiving pits.

k. Rock Excavation and Restoration is included for payment elsewhere.

l. This item includes all cost to connect to lead or galvanized service and shall not result in additional costs to the OWNER.

2. Measurement:

a. The quantity to be paid for under this item shall be the actual number of Water Service Connections or Blow-offs installed as shown, specified or directed.

b. Each Water Service Installation shall include the first 10-feet of copper or polyethylene tubing at the unit price bid for Items 9A. Additional copper and polyethylene tubing beyond 10-feet shall be measured for payment at the unit price bid per linear foot for Items 9B.

c. Each Blow-off shall include all mainline connection, piping, valves, and appurtenances at the unit price bid for Items 9C.

3. Payment:

a. The unit price bid for this item shall be full compensation for furnishing all labor, equipment and materials not furnished by OWNER required to install, test, disinfect and place into service the Water Service Connections and Blow-offs.

b. The subdivisions of this item are:

9A Water Service Connections
- 9A1 ¾-inch to 1-inch Copper Service
- 9A2 1 ½-inch to 2-inch Copper Service
- 9A3 ¾-inch to 1-inch Polyethylene Service
- 9A4 1 ½-inch to 2-inch Polyethylene Service

9B Additional Copper and Polyethylene Tubing
- 9B1 ¾-inch to 1-inch Copper Service
- 9B2 1 ½-inch to 2-inch Copper Service
- 9B3 ¾-inch to 1-inch Polyethylene Service
- 9B4 1 ½-inch to 2-inch Polyethylene Service

9C Blow-off Assemblies
- 9C1 2-inch Blow-off Assembly
- 9C2 2-inch Temporary Blow-off Assembly
- 9C3 4-inch Blow-off Assembly
- 9C4 4-inch Temporary Blow-off Assembly
- 9C5 8-inch Blow-off Assembly

J. ITEM 10 - CASING PIPE

1. Work Included:

a. This item includes all labor, material, equipment and incidentals required to furnish and install casing pipes as shown, specified or directed. This item also includes annular fill within the casing pipe, brick bulkheads, anodes for cathodic protection, excavation of receiving pits and boring pits, sheeting, dewatering, skids or spacers, protection of existing structures and utilities and all other

work required for a complete installation.

b. Casing pipe, end seals, isolators, cathodic protection, annular fill, etc. materials shall be furnished by CONTRACTOR with the carrier pipe being supplied by the OWNER.

c. All sheeting and shoring necessary to construct the boring and receiving pits shall be included in the price bid for this item. This shall include any sheeting and shoring directed to be left in place by the ENGINEER or by the agency having jurisdiction over the R.O.W., or any left in place for the convenience of the CONTRACTOR.

d. Select Backfill for the boring pit and receiving pit shall be included for payment under Item 10A.

e. Item 10C includes payment of additional cost for furnishing all additional labor, materials, equipment, and incidentals required to perform boring of casing pipes to advance the casing pipe in rock to the lines and grade as shown, specified, or directed.

f. Test Pit Excavations required to determine the locations and elevation of existing utilities and obstacles, shall be included in the cost of this item. Where directed by the ENGINEER, these excavations shall be backfilled with select fill which cost shall also be included in this item.

g. Installation of the carrier pipe shall be paid for under Item 1A. Rock Excavation shall be included for payment under Item 7A.

h. This item includes all items and work necessary for the proper maintenance and protection of traffic of City, Town, and Village roads as defined in Section 01550. Maintenance and protection of traffic for County and State roads will be paid under Item 14B2.

2. Measurement:

a. The quantity to be paid for under Items 10A and 10B shall be the linear foot of casing pipe installed as shown, specified, or directed.

b. The quantity to be paid for under Item 10C shall be the actual amount of rock boring in linear feet, necessary and required to advance the casing in rock to the limits as shown, specified, or directed. The lengths shall be measured along the centerline of the casing and only for the length in rock.

3. Payment:

a. The unit price bid per linear foot for this item shall be the full compensation for furnishing all labor, material, equipment, and incidentals required to furnish and install casing pipe.

b. The unit price bid per linear foot for Item 10C shall be full compensation for furnishing all additional labor, materials, equipment, and incidentals required to perform rock boring to advance casing pipe in rock as shown, specified, or directed.

c. The subdivisions of this item are:

10A Trenchless Casing Pipe Installation
10A1 18-inch Diameter

10A2 20-inch Diameter
10A3 24-inch Diameter
10B Open-cut Casing Pipe Installation
10B1 18-inch Diameter
10B2 20-inch Diameter
10B3 24-inch Diameter
10C Additional for Trenchless Casing Pipe Installation in Rock
10C1 16-inch to 18-inch Diameter
10C2 20-inch to 24-inch Diameter

K. ITEM 11 – HORIZONTAL DIRECTIONAL DRILLING (HDD)

1. Work Included:
   a. This item includes all labor, materials, equipment and incidentals required to perform the HDD include centralizers (as required) as shown and specified.
   b. This item includes rock drilling.
   c. Pipe installed through the HDD shall be paid under Item 1, DIP and HDPE only. PVC shall not be utilized within the HDD limits.
   d. This item includes earth excavation and backfill for the boring and receiving pits.
   e. Rock excavation for boring and receiving pits shall be paid for under Item 7A.
   f. Select backfill shall be paid for under Item 8A.
   g. Temporary and permanent restoration shall be paid under Item 13.
   h. This item includes all items and work necessary for the proper maintenance and protection of traffic of City, Town, and Village roads as defined in Section 01550. Maintenance and protection of traffic for County and State roads will be paid under Item 14B2.
   i. This item includes coordination with 3rd party utility companies.
   j. This item includes the electrical bonding of all joint, as required.
2. Measurement:
   a. The quantity to be paid for under this item shall be for the completed HDD as shown, specified, or directed
3. Payment:
   a. The unit prices bid per linear foot shall be full compensation for furnishing all labor, materials, equipment, and incidentals necessary to install and place into service the HDD as shown, specified, or directed.
   b. The subdivisions of this item are:
      11A HDD
         11A1 4-inch to 10-inch watermain
         11A2 12-inch to 16-inch watermain

L. ITEM 12 - TESTING AND DISINFECTION

1. Work Included:
   a. This item includes flushing, sampling and testing, pressure and leakage testing, and disinfection of the watermain and fittings prior

to placing the watermains into service. The watermain and valves are not considered pressure or leakage tested until the pipe complies with the specifications. All necessary retesting will be at the CONTRACTOR'S expense. The CONTRACTOR shall adhere to the application procedures outlined in the specification for disinfection and flushing. All sampling and testing shall be at the points specified and in accordance with the latest Health Department requirements.

b. CONTRACTOR shall submit all required information under Section 154140 prior to commencement of the WORK.

2. Measurement:

a. The quantity of disinfection and testing shall be the number of linear feet of watermain installed within the limits shown, specified, or directed. The length shall be measured along the centerline of the pipe without regard for valves, fittings or hydrant assemblies.

3. Payment:

a. The unit prices bid for testing and disinfection items shall be at the fixed minimum unit price established by the OWNER or as modified by CONTRACTOR, whichever is greater, as stated in the Bidder's Proposal and shall be full compensation for all labor, materials, equipment, sampling, testing, and incidentals necessary to test and place into service new watermain as shown, specified, or directed.

b. The subdivisions of this item are:

12A Testing and Disinfection of Watermain Lengths of 200-feet or less

12A1 4-inch Watermain (includes 6-inch HDPE)
12A2 6-inch Watermain (includes 8-inch HDPE)
12A3 8-inch Watermain (includes 10-inch HDPE)
12A4 10-inch Watermain (includes 12-inch HDPE)
12A5 12-inch Watermain (includes 16-inch HDPE)

12B Testing and Disinfection of Watermain Lengths of greater than 200-feet

12B1 8-inch Watermain (includes 10-inch HDPE)
12B2 10-inch Watermain (includes 12-inch HDPE)
12B3 12-inch Watermain (includes 16-inch HDPE)

M. ITEM 13 - RESTORATION

1. Work Included:

a. This item includes all labor, materials, equipment, sampling, testing and incidentals necessary to restore asphalt, concrete, stone or gravel surfaces, landscaping, curbs/gutters, lawn areas, and other features disturbed, damaged or destroyed during the performance of the work.

b. Restoration materials shall be furnished by CONTRACTOR

c. For additional clearing and grubbing, this item includes clearing beyond 15-feet in width as shown, specified, or directed.

d. For asphalt restoration, this item shall include the application of a bituminous tack coat at all sawcut areas and between asphalt pavement layers as shown, specified or directed.

e. This item shall include any sawcutting of asphalt or concrete as shown, specified, or requested.

f. This item shall include the proper consolidation of subgrade before installing pavement or sidewalk.

g. This item shall include the maintenance of temporary restoration until final restoration has been completed. This includes but is not limited to settlement, erosion, ponding, etc.

h. This item shall include the permanent and final repaving of all streets, driveways and similar surfaces, where pavement has been removed, disturbed, settled or damaged by or as a result of performance of this Contract. This item shall also include the application of permanent pavement markings as required by the appropriate highway jurisdiction.

i. This item shall include the cost to remove, restore, and/or replace traffic signal equipment as necessary for the installation of the water system improvements.

j. For cold milling, this item shall include cold milling of the existing asphalt pavement to the limits and depths detailed on the Contract Drawings.

k. For cold milling, this item shall include the application of a bituminous tack coat on all cold milled areas as shown, specified or directed.

l. For asphalt sealant, this item includes the sealing of asphalt driveways and sidewalks the limits of repair plus 3-feet outside the repair edge.

m. This item shall include maintenance of all lawn areas until establishment of a good stand of grass and the first mowing.

n. Restoration of all areas outside the payment limits is the responsibility of the CONTRACTOR and shall conform to the Contract Requirements which apply.

o. For tree and shrub replacement, item includes all costs for tree planting with trees and shrubs in like and kind as shown, specified or directed.

p. For repairing damaged trees, item includes all costs for tree repair including but not limited to pruning and wrapping within the construction limits.

2. Measurement:

a. The quantity of concrete restoration (except for curb/gutter restoration) and asphalt restoration for which payment will be made will be computed using the payment dimension on the trench payment limits detail without regard to the actual dimension or

quantities required and the number of linear feet of watermain installed as measured along the centerline of the pipe without regard for valves or fittings. The area shall be figured on the basis of square yardage within the trench limits as shown, specified, or directed.

b. The quantity of cold milling shall be the number of square yards of pavement surface milled to a depth as detailed on the plans or as directed. In no case will a deduction be made for minor unmilled areas due to catch basins, manholes or minor low areas in pavement from the measured surface areas that has been milled. Minor unmilled or low areas are those areas of 3 square yards or less.

c. The quantity of concrete curb/gutter restoration shall be the number of linear feet of curb/gutter installed within the limits shown, specified, or directed.

d. The quantity of landscape restoration shall be the number of linear feet of watermain installed within the limits shown, specified, or directed. The length shall be measured along the centerline of the pipe without regard for valves or fittings.

e. The quantity of tree and shrub replacement shall be the actual number by type of tree replacement within work limits.

f. The quantity of repairing damage trees shall be the actual number of tree repairs within work limits.

g. The quantity of fertilizing existing trees shall be the actual number of trees fertilizing within work limits.

3. Payment:

a. The unit prices bid for restoration items shall be at the fixed minimum unit price established by the OWNER where shown in the Bid Proposal or as modified by the CONTRACTOR, whichever is greater, as stated in the Bidder's Proposal. The prices bid for these items shall be full compensation for all labor, material, equipment, sampling, testing and incidentals necessary for restoration as shown, specified, or directed and within the pay limits shown specified, or directed.

b. The unit prices bid for restoration items that are not at fixed minimum unit prices shall be full compensation for furnishing all labor, materials, and equipment required to furnish and install restoration items within the pay limits as shown, specified, or directed.

c. The subdivisions of this item are:

13A Clearing and Grubbing

13A Clearing and Grubbing

13B Pavement Restoration

13B1 Asphalt Pavement Restoration

13B2 Concrete Pavement Restoration

13B3 Concrete wit Asphalt Top Pavement Restoration

13B4 Asphalt Shoulder Restoration
13B5 Concrete Gutter Restoration
13B6 Concrete Curb Restoration
13B7 Granite Curb Restoration
13B8 Cold Milling of Asphalt Top at 1-inch to 2-inch depth
13B9 Cold Milling of Asphalt Top at each 1-inch depth over 2-inch depth
13B10 Cold Patch (high performance) per 3-inch depth
13B11 Traffic Loop Installation

13C Sidewalk Restoration
13C1 Asphalt Sidewalk Restoration
13C2 Concrete Sidewalk Restoration

13D Driveway Restoration
13D1 Asphalt Driveway Restoration
13D2 Concrete Driveway Restoration

13E Asphalt Sealant
13E1 Asphalt Sealant for driveway and sidewalks

13F Lawn Restoration
13F1 Lawn Restoration

13G Landscaping Restoration
13G1 Deciduous Trees, 3-feet to 4-feet (balled)
13G2 Deciduous Trees, 1 ½-inch to 2-inch caliper (balled)
13G3 Deciduous Trees, 4-inch to 4 ½-inch caliper (balled)
13G4 Deciduous Shrubs, 3-feet to 4-feet (bare root)
13G5 Evergreen Trees, 5-feet to 6-feet (balled)
13G6 Evergreen Shrubs, 2 ½ feet to 4-feet (balled)
13G7 Repairing Damaged Trees
13G8 Fertilizing Existing Trees

N. ITEM 14 – CREW RATE AND CONSTRUCTION ALLOWANCE

1. Crew and Survey Crew Labor and Equipment (Item 14A)

a. Work included:

1) This item includes providing a crew consisting of labor and equipment to be used when ordered by ENGINEER to perform water service related work in addition to work covered elsewhere by unit price items.

2) The crew included under Item 14A1 shall consist of, at a minimum, two skilled laborers; one supplemental laborer; one wheeled loader/backhoe; one tandem dump truck; and, one fully equipped tool and equipment truck with trailer.

3) The crew include under Item 14A2 shall consist of, at a minimum, instrument person; safety road signage; and survey equipment.

4) The crew include under Item 14A3 shall consist of, at a minimum, two skilled laborers; vacuum truck; and safety road signage.

5) Additional payment shall not be made if CONTRACTOR provides additional labor or equipment beyond what is specified herein or ordered.

6) This item includes all related costs of CONTRACTOR, including, but not limited to, supervision, wages, benefits, operating costs, overhead, profit, fuel, insurance, permits, licenses, home office costs, maintenance and protection of traffic, permit conditions, etc.

7) The use of crew labor and equipment will be ordered by ENGINEER when, at a specific site that is scheduled for water system improvements, it is so determined that it would be in the best interest to the Authority that related work be performed.

8) This item may also be used by ENGINEER to order other Work when not covered by other unit price items.

9) OWNER shall furnish CONTRACTOR all waterline materials for Work when so ordered under this item. It shall be the CONTRACTOR'S responsibility to obtain these materials at no additional cost to OWNER and the cost shall be included herein. The CONTRACTOR shall furnish and install select backfill and cold patch and the cost shall be included herein.

10) For vacuum truck and crew, the CONTRACTOR shall include the cost of the vacuum truck and crew. All backfill materials and restoration materials will be paid under various Items herein.

11) Final restoration shall be performed by the CONTRACTOR.

b. Measurement:

1) The quantity to be paid for under this item shall be the actual number of crew labor and equipment hours performed by CONTRACTOR as ordered by ENGINEER.

2) Payment for Item 14A1, Item 14A2, and Item 14A3 shall start when the crew and equipment arrives at the site and ends when the crew and equipment leaves the site when the Work is completed or when ENGINEER orders the crew time ended. There shall be no payment for travel time to or from the CONTRACTOR'S place of business. Payment will be made for travel time between two Work sites for the equipment necessary for the second or succeeding work.

3) The OWNER reserves the right to dismiss the crew from a site when it is determined that it is no longer needed. The CONTRACTOR may elect, for his own convenience, to keep the dismissed labor and equipment on the site or return them to his place of business when the job is done, but no payment shall be made for them.

c. Payment:

1) The unit price bid for this item shall be full compensation for furnishing all labor, equipment, and incidentals required to perform Crew and Survey Crew Labor and Equipment as ordered or necessary.

2) The subdivisions of this item are:

14A Crew Labor and Equipment

14A1 Crew Labor and Equipment

14A2 Survey Crew Labor and Equipment

14A3 Vacuum Truck and Crew Labor

2. Construction Allowance (Item 14B)

a. Work Included:

1) Section 01210, Allowances, includes a stipulated amount available as reserve for sole use by OWNER to cover unanticipated costs.

b. Measurement:

1) For General Construction Allowance work will consist of approved water system improvements not covered in other bid items and as specified or directed by ENGINEER.

2) For Maintenance and Protection of Traffic (State and County Roads) Allowance work will consist of providing the services of a work zone safety equipment rental and setup firm to provide Maintenance and Protection of Traffic throughout the Erie County Water Authority Service Area along State and County Roads as maybe required to perform water system improvements and restoration activities.

c. Payment:

1) Payment of Work authorized under this Item will be full compensation for providing all Work authorized under the contingency allowance, complete as specified or directed by ENGINEER. Work authorized under contingency allowance may include in subsequent Application(s) for Payment, as applicable, following authorization and performance of contingency work.

2) The subdivisions of this item are as follows:

14B Construction Allowance

14B1 General Construction Allowance

14B2 Maintenance and Protection of Traffic (State and County Road) Allowance

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01290

SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Schedule of Values is an itemized list that establishes the value or cost of each part of the Work. It shall be used as the basis for preparing progress payments and may be used as a basis for negotiations concerning additional work or credits, which may arise during the construction. Quantities and unit prices may be included in the schedule when approved by or required by the ENGINEER.

1.02 PREPARATION

A. Schedule shall show breakdown of labor, materials, equipment, and other costs used in preparation of the Bid.

B. Costs shall be in sufficient detail to indicate separate amounts for each Section of the Specifications.

C. CONTRACTOR may include an item for bond, insurance, temporary facilities and job mobilization on lump sum project only. This item will be included for payment at a rate of 25 percent per month for the first four months.

D. Schedule of Values shall be prepared on 8-½-inch by 11-inch white paper.

E. Use Table of Contents of the Specifications as basis for Schedule format and identify each item with number and title in the Table of Contents. List sub-items of major products or systems as appropriate or when requested by ENGINEER.

F. When requested by ENGINEER, support values with data that will substantiate their correctness.

G. The sum of the individual values shown on the Schedule of Values must equal the total Contract Price.

H. Each item shall include a directly proportional amount of the CONTRACTOR'S overhead and profit.

I. Schedule shall show the purchase and delivery costs for materials and equipment that the CONTRACTOR anticipates he shall request payment for prior to their installation.

J. Included in the detailed breakdown shall be a line item for “record documents”. This amount is for preparing and supplying required information and documentation as described in Section 01720, Survey Data.

1.03 SUBMITTAL

A. Submit two copies of Schedule to ENGINEER for approval at least 20 days prior to submitting first application for a progress payment but no later than 10 days after date of execution of agreement. After review by ENGINEER, revise and resubmit Schedule as required until it is approved.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01322

CONSTRUCTION PHOTOGRAPHS

PART 1 – GENERAL

1.01 DESCRIPTION

A. CONTRACTOR shall retain a qualified individual to perform the services specified below.

B. Obtain ENGINEER'S approval of the photographer selected prior to taking first photographs.

C. Digital photography will be accepted if evidence of quality is provided to ENGINEER.

D. All photographs taken are to be in color.

1.02 PRECONSTRUCTION PHOTOGRAPHS

A. CONTRACTOR shall be responsible for taking a sufficient number of preconstruction photographs so as to resolve any disputes which may arise regarding the conditions prior to and subsequent to construction.

B. If a dispute arises where no preconstruction photographs were taken, the disputed area shall be restored by the CONTRACTOR to the extent directed by the ENGINEER and to the complete satisfaction of the ENGINEER, at no additional cost to the OWNER.

C. The CONTRACTOR must furnish one set of color prints of the preconstruction photographs to the ENGINEER and must make others available for review in settling any disputes.

D. The ENGINEER may, at his option, take additional preconstruction photographs which may be used to settle disputes, but he will not be required to make these photographs available to the CONTRACTOR.

E. Preconstruction photographs taken by the CONTRACTOR will not be considered as part of the required number of construction photographs required in Paragraph 1.03 below.

1.03 PHOTOGRAPHS

A. Take a minimum of 25 color, glossy finish photographs during the construction period.

B. Photographs shall be taken approximately twice each month and when requested by the ENGINEER.

C. ENGINEER will approve the views to be taken and select the time at which they will be taken.

D. A minimum of 5 photographs will be taken each time the photographer is at the site.

E. For outside construction projects, take photographs in good weather with sufficient ambient light. For inside construction projects, use a flash as necessary in low-light conditions.

F. A minimum of three (3) photographs shall be taken for each interconnection and abandonment (prior to backfilling) showing the pipe connections established.

1.04 PRINTS

A. Furnish three prints and negatives of each photograph to the ENGINEER as soon as they are available from the photographer.

B. Furnish additional photographs or prints requested by ENGINEER at cost.

C. Provide high quality 5-inch by 7-inch standard weight prints with a glossy finish.

D. Place the following information on the back of each print:
1. Date photograph was taken.
2. Title of Project.
3. Description of view shown in photograph.
4. Name and address of photographer.
5. Photographer's numbered identification of exposure.

1.05 DIGITAL PHOTOS (IF ACCEPTED AS ALTERNATE)

A. If acceptable to OWNER and ENGINEER, CONTRACTOR shall provide digital, color photographs having a minimum resolution of 12 megapixels each.

B. CONTRACTOR shall furnish a compact disk (CD) with each photograph in JPEG (Joint Photographic Experts Group) format and project title identified.

C. Filenames of digital photographs will be the project number followed by date and by either a sequential number or description of view.

D. A log will be included identifying for each photo:
1. Filename.
2. Date photograph was taken.
3. Description of view shown in photograph.
4. Name and address of photographer.

1.06 VIDEO

A. Provide two video disks, in DVD format, of the construction area both prior to and post construction. Each video must be minimum 15 minutes long with verbal narration while walking the project site to depict the existing or new condition of all areas affected by the construction.

B. Submit two copies of each video to ENGINEER for review.

C. CONTRACTOR shall be responsible for taking video, which includes all areas of construction so as to resolve any disputes, which may arise regarding the conditions prior to and subsequent to the construction.

D. For outside construction projects, take videos in good weather with sufficient ambient light.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01410

OPERATIONS IN HIGHWAY RIGHTS-OF-WAY

PART 1 - GENERAL

1.01 DESCRIPTION

A. CONTRACTOR shall obtain all necessary permits, arrange all inspections required by the state and pay all charges. He shall conform with all applicable State, County, City, Town, and Village Highway Department rules and regulations.

B. Work may be installed by the open cut method where shown or directed, however, traffic flow shall be maintained. A minimum of two lanes of traffic shall be kept flowing at all times.

C. CONTRACTOR shall comply with all current New York State Department of Transportation requirements for traffic protection and all requirements in Section 01550, Maintenance and Protection of Traffic.

D. Work shall be located as shown, and CONTRACTOR shall install materials, pipe, fittings, and adapters that are required to implement crossings of existing pipe lines, utilities or other structures. A supply of pipe fittings, adapters and short lengths shall be on hand to expedite the crossings.

E. Pavement: When backfill is stabilized in accordance with State Highway Department requirements and these Specifications, CONTRACTOR shall replace the street pavement and base with pavement of similar type and equal thickness to the pavement which was removed. This pavement and base shall be constructed in complete accordance with the requirements of the State, County and local municipal jurisdiction.

F. Copies of Permit Application Forms for the State, County of Erie, and Local Municipal Highway Permit Application is included in the Appendix.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01450

TESTING LABORATORY SERVICES FURNISHED BY CONTRACTOR

PART 1 - GENERAL

1.01 DESCRIPTION

A. CONTRACTOR shall employ and pay for an independent testing laboratory to perform the specified services. Laboratory selected shall be subject to approval by the ENGINEER.

B. Inspection, sampling and testing shall be as specified in the Technical Sections.

1.02 QUALIFICATIONS OF LABORATORY

A. Where applicable, meet "Recommended Requirements for Independent Laboratory Qualification", latest edition, published by American Council of Independent Laboratories and the basic requirements of ASTM E329, Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

B. The laboratory shall be certified by New York State for testing potable water. A NYS ELAP number shall be referenced on all test results.

C. Submit copies of ELAP certificates for all potable water testing.

D. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during most recent tour of inspection; with memorandum of remedies of any deficiencies reported by inspection.

E. Testing Equipment:
   1. Calibrated at maximum 12 month intervals by devices of accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.
   2. Submit copy of certificate of calibration, made by accredited calibration agency.

1.03 LABORATORY DUTIES

A. Cooperate with ENGINEER and provide qualified personnel promptly on notice.

B. Perform specified inspections, sampling and testing of materials and methods of construction; comply with applicable standards; ascertain compliance with requirements of Contract Documents.

C. Promptly notify ENGINEER and CONTRACTOR of irregularities or deficiencies of Work, which are observed during performance of services.

D. Promptly submit 5 copies of reports of inspections and tests to ENGINEER including:
   1. Date issued.
   2. Project title and number.
   3. Testing laboratory name and address.
   4. Name and signature of inspector.
   5. Date of inspection or sampling.
   6. Record of temperature and weather.
   7. Date of test.
   8. Identification of product and Specification Section.
   9. Location in Project.
   10. Type of inspection or test.
   11. Results of tests and observations regarding compliance with Contract Documents.

E. Perform additional tests and services as required to assure compliance with the Contract Documents.

1.04 CONTRACTOR'S COORDINATION WITH LABORATORY

A. Cooperate with laboratory personnel, provide access to Work and to manufacturer's operations.

B. Provide to laboratory, representative samples of materials to be tested, in required quantities.

C. Furnish labor and facilities:
   1. To provide access to Work to be tested.
   2. To obtain and handle samples at the site.
   3. To facilitate inspections and tests.
   4. For laboratory's exclusive use for storage and curing of test samples.
   5. Forms for preparing concrete test beams and cylinders.

D. Notify laboratory and ENGINEER sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests.

E. Arrange with laboratory and pay for, additional samples and tests required for CONTRACTOR'S convenience.

1.05 PRODUCT TEST REPORTS

A. Furnish copies of product test reports where required by the Specifications or requested by ENGINEER.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01525

EMERGENCY TELEPHONE NUMBERS

PART 1 - GENERAL

1.01 EMERGENCY TELEPHONE NUMBERS

A. The CONTRACTOR shall, at the CONTRACTOR'S expense, furnish to the ENGINEER an emergency phone number list for 24-hour contact during the construction period. Include numbers for office phones, pagers, and cellular phones, as applicable.

B. The list should include, but not be limited to:
1. CONTRACTOR'S office representative,
2. CONTRACTOR'S field superintendent,
3. CONTRACTOR'S foreman,
4. OWNER'S main office,
5. OWNER'S 24 hour emergency number,
6. PROJECT ENGINEER,
7. PROJECT INSPECTOR,
8. Utility companies such as gas, water, sewer, oil, telephone, cable, TV, etc.,
9. Highway Departments,
10. Fire Departments serving the project limits,
11. Police Emergency number,
12. New York State Department of Environmental Conservation (NYSDEC) Spill Response Hotline,
13. Other involved agencies.

C. CONTRACTOR shall add names and numbers given to him by ENGINEER and resubmit to ENGINEER as requested.

D. Emergency phone list must be submitted and considered acceptable to ENGINEER and OWNER prior to the start of construction.

E. Phone list must be neatly typed or word processed and submitted on 8-½ x 11 inch paper.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01550

MAINTENANCE AND PROTECTION OF TRAFFIC

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified
The work specified shall include all labor, material, equipment, services and incidentals necessary to maintain and protect vehicular and pedestrian traffic through all construction areas.

B. Related Work Specified Elsewhere
1. Division 2-15, Technical Specifications,
2. Section 15051 - Buried Piping Installation

1.02 QUALITY ASSURANCE

A. Reference Standards
New York State Department of Transportation Standard Specifications, latest revision.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. This work shall consist of maintaining traffic and protecting the public from damage to person and property within the limits of and for the duration of the Contract.

B. All existing site roads, streets, sidewalks, and traffic ways shall be kept open for the passage of traffic and pedestrians during the construction period unless otherwise approved by the OWNER, ENGINEER or authority having jurisdiction over same.

C. When required to cross, obstruct or temporarily close an existing site road, street, sidewalk or trafficway, CONTRACTOR shall provide and maintain suitable detours or other approved temporary expedient for the accommodation of traffic. Closings shall be for the shortest time practical, and passage shall be restored immediately after completion of backfill and temporary paving or bridging.

D. CONTRACTOR shall give 48 hours advance notice to the fire and police departments of his proposed operations including temporary shutdowns.

E. CONTRACTOR shall provide signs, signals, barricades, flares, lights and all other equipment, service and personnel required to regulate and protect all traffic and warn of hazards. All such work shall conform to requirements of the OWNER or authority having jurisdiction. Remove temporary equipment and facilities when no longer required, restore grounds to original, or to specified conditions.

F. Traffic shall be maintained over a reasonably smooth traveled way which shall be so marked by signs, delineators, guiding devices and other methods, that a person who has no knowledge of conditions may safely, and with a minimum of discomfort and inconvenience, ride, drive or walk, day or night, over all or any portion of the street under construction where traffic is to be maintained. All work shall conform to the requirements of the current New York State Manual of Uniform Traffic Control Devices.

G. CONTRACTOR shall control dust and keep the traveled way free from materials spilled from hauling equipment.

H. CONTRACTOR shall provide the necessary traffic control equipment and flagmen for adequate traffic control on the traveled way. Flaggers shall be used where opposing traffic is restricted to one (1) lane or where other conditions require, or as required by permit conditions.

I. CONTRACTOR shall provide ingress and egress to and from intersecting streets, homes, businesses and commercial establishments.

J. CONTRACTOR shall provide adequate protection for pedestrian traffic during all phases of construction.

K. CONTRACTOR shall maintain existing bus stops, if any, so passengers are reasonably accommodated.

L. CONTRACTOR shall make the necessary repairs to existing pavement as required to provide a reasonable smooth traveled way where vehicle operation is maintained.

M. The CONTRACTOR’S responsibility to the public is to protect the public from damage to person and property, which may result directly or indirectly from any construction operation.

N. The CONTRACTOR shall provide temporary markings in accordance with provisions of the New York State Manual of Uniform Traffic Control Devices, as required by the agency having jurisdiction, as shown in the plans and specifications and/or as ordered by the ENGINEER

O. The CONTRACTOR shall schedule work to keep to a minimum and consistent with the physical requirements of the contract, the amount of existing pavement and/or facilities that are destroyed or substantially torn up at any one time.

P. The CONTRACTOR shall at all times conduct his operations in a manner to insure the convenience of the motorist, the pedestrians and the abutting property owners and their safety as well as the safety of his own employees.

Q. The CONTRACTOR shall furnish, install, move, remove and maintain all signs and barricades and lighting for construction barricades as shown on the plans or as ordered by the ENGINEER, and in accordance with the NYS Manual of Uniform Traffic Control Devices.

R. The CONTRACTOR shall provide and maintain delineation and guiding devices which shall include: delineators, barrels, flashers, railing, temporary curb of any kind, pavement markings, and other similar materials or methods acceptable to the ENGINEER

S. The CONTRACTOR shall construct, move or remove, as directed, temporary structures, approaches, detours, pavements and necessary appurtenances.

T. The CONTRACTOR will be responsible to prepare a maintenance and protection of traffic plan and submit the plan to the ENGINEER for information and the Erie County Highway Department and/or NYS DOT (as required) for approval. The maintenance and protection of traffic plan shall be prepared by an engineer licensed to practice in the State of New York.

3.02 PARKING CONTROL

A. Control all CONTRACTOR related vehicular parking within the limits of the Work to preclude interference with public traffic or parking, access by emergency vehicles, OWNER'S operations, or construction operations. Provide temporary parking facilities as may be required because of construction or operations.

B. Monitor parking of all construction and private vehicles:
1. Maintain free vehicular access to and through parking areas.
2. Prohibit parking on or adjacent to access roads, or in non-designated areas.
3. Parking will not be allowed in areas which limit sight distance of passing motorists.
4. CONTRACTOR is responsible for his vehicles while on-site.

3.03 HAUL ROUTES

A. Consult with governing authorities and establish thoroughfares which will be used as haul routes and site access.

B. Provide traffic control of haul routes to expedite traffic flow and to minimize interference with normal traffic.

3.04 ADDITIONAL REQUIREMENTS

A. The CONTRACTOR shall maintain the traveled way reasonable smooth and hard at all times, and shall be well drained and free of potholes, bumps, irregularities and depressions that hold or retain water. Construction operations shall be conducted to insure a minimum of delay to traffic. Stopping traffic for more than five minutes shall not be permitted unless specifically authorized, in writing, by the ENGINEER. The necessary equipment and personnel to attain and maintain a satisfactory riding surface shall be available and used as needed at all times when work is under way and when work is temporarily suspended for any period of time. Special attention to maintenance of a satisfactory traveled way shall be given during weekends, holidays and the winter season.

B. The CONTRACTOR shall provide a sufficient number of competent flagmen in areas where traffic exists, particularly where construction equipment is operating. Each flagger shall use an orange safety vest. The vest shall be worn outside all other clothing worn by the flagger.

C. Traffic shall be maintained in accordance with the details shown in conformance with the New York State Manual of Uniform Traffic Control Devices.

D. Fencing

1. The CONTRACTOR shall completely enclose all open excavations and all other potentially hazardous location, at the end of each working day by temporary fences. Fencing shall be not less than four feet in height, mounted in steel angles or other satisfactory means of support rigidly driven into the ground and spaced at intervals not to exceed eight feet. A minimum of one flasher per fifteen feet of fencing will be required. In areas where an excavation is to remain open in excess of 14 calendar days, rigid fencing will be required having supports at intervals not to exceed four feet. Snow fence, cyclone fence, or wire fabric with rectangular mesh are considered minimally acceptable fencing materials.
2. The ENGINEER in charge may limit, extend, include or exclude areas to be fenced as conditions warrant.

E. Where sidewalk has been removed by the CONTRACTOR, he will be responsible for establishing a temporary stabilized walk for pedestrian traffic within 24 hours after removal of the sidewalk. This sidewalk may be located in the location of the original sidewalk or adjacent to the original sidewalk, providing there is an adequate right-of-way and the new location is safe for pedestrian traffic. The minimum width of the walkway is 4 feet. No additional Payment will be made for installing and/or maintaining this walkway by the CONTRACTOR.

F. All existing highway signs and supports within the Contract limits are to remain and are to be maintained for the duration of the Contract by the CONTRACTOR.

G. On postal routes, mailboxes serviced from motor vehicles shall be maintained by the CONTRACTOR in a usable location during construction. The CONTRACTOR should not move any mailbox which contains mail. He will advise the property owner to remove such mail before he moves the box. Before acceptance of the work, any mailbox which has been disturbed or removed shall be replaced in size, kind and type by the CONTRACTOR in a location acceptable to the property owner and the ENGINEER.

H. CONTRACTOR must provide access to all school buses and emergency vehicles including ambulances, police cars, fire engines, etc., traveling through or stopping at any part of the construction site. At his expense, CONTRACTOR will yield to these vehicles and cease construction activities, as necessary.

END OF SECTION

SECTION 01561

SECURITY

PART 1 - GENERAL

1.01 DESCRIPTION

A. CONTRACTOR shall safely guard all Work, materials, equipment and property from loss, theft, damage and vandalism. CONTRACTOR'S duty to safely guard property shall include the OWNER'S property and other private property from injury or loss in connection with the performance of the Contract.

B. He shall employ watchmen as needed to provide the required security and prevent unauthorized entry.

C. CONTRACTOR may make no claim against the OWNER for damage resulting from trespass.

D. Party responsible for security shall make good all damage to property of OWNER and others arising from failure to provide adequate security.

E. If existing fencing or barriers are breached or removed for purposes of construction, CONTRACTOR shall provide and maintain temporary security fencing equal to the existing in a manner satisfactory to the ENGINEER and OWNER.

F. Security measures taken by the CONTRACTOR shall be at least equal to those usually provided by OWNER to protect his existing facilities during normal operation.

G. Maintain security program throughout construction until OWNER'S acceptance and occupancy precludes need for CONTRACTOR'S security program.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01562

PROTECTION OF THE WORK AND PROPERTY

PART 1 - GENERAL

1.01 DESCRIPTION

A. CONTRACTOR shall be responsible for taking all precautions, providing all programs, and taking all actions necessary to protect the Work and all public and private property and facilities from damage as specified in the General Conditions and herein.

B. In order to prevent damage, injury or loss, CONTRACTOR'S actions shall include, but not be limited to, the following:

1. Store apparatus, materials, supplies, and equipment in an orderly, safe manner that will not unduly interfere with the progress of the Work or the Work of any other contractor or utility service company.
2. Provide suitable storage facilities for all materials which are subject to injury by exposure to weather, theft, breakage, or otherwise.
3. Place upon the Work or any part thereof only such loads as are consistent with the safety of that portion of the Work.
4. Clean up frequently all refuse, rubbish, scrap materials, and debris caused by his operations, to the end that at all times the site of the Work shall present a safe, orderly and workmanlike appearance.
5. Provide barricades and guard rails around openings, for scaffolding, for temporary stairs and ramps, around excavations, elevated walkways and other hazardous areas.

C. CONTRACTOR shall not, except after written consent from proper parties, enter or occupy privately-owned land with men, tools, materials or equipment, except on easements provided herein.

D. CONTRACTOR shall assume full responsibility for the preservation of all public and private property or facility on or adjacent to the site. If any direct or indirect damage is done by or on account of any act, omission, neglect or misconduct in the execution of the Work by the CONTRACTOR, it shall be restored by the CONTRACTOR, at his expense, to a condition equal to that existing before the damage was done

1.02 BARRICADES AND WARNING SIGNALS

A. Where Work is performed on or adjacent to any roadway, right-of- way, or public place, CONTRACTOR shall provide barricades, fences, lights, warning signs, danger signals, watchmen, and shall take other precautionary measures for the protection of persons or property and of the Work. Barricades shall be painted to be visible at night. From sunset to sunrise, CONTRACTOR shall furnish and

maintain at least one light at each barricade. Sufficient barricades shall be erected to keep vehicles from being driven on or into Work under construction. CONTRACTOR shall furnish watchmen in sufficient numbers to protect the Work. CONTRACTOR'S responsibility for the maintenance of barricades, signs, lights, and for providing watchmen shall continue until the Project is accepted by OWNER.

1.03 TREE AND PLANT PROTECTION

A. CONTRACTOR shall protect existing trees, shrubs and plants on or adjacent to the site that are shown or designated to remain in place against unnecessary cutting, breaking or skinning of trunk, branches, bark or roots.

B. Materials or equipment shall not be stored or parked within the drip line.

C. Temporary fences or barricades shall be installed to protect trees and plants in areas subject to traffic.

D. Fires shall not be permitted under or adjacent to trees and plants.

E. Within the limits of the work, water trees and plants that are to remain, in order to maintain their health during construction operations.

F. Cover all exposed roots with burlap that shall be kept continuously wet. Cover all exposed roots with earth as soon as possible. Protect root systems from mechanical damage and damage by erosion, flooding, run-off or noxious materials in solution.

G. If branches or trunks are damaged, prune branches immediately and protect the cut or damaged areas with a nursery product specifically for horticultural use in a manner approved by the ENGINEER.

H. All damaged trees and plants that die or suffer permanent injury shall be removed when ordered by the ENGINEER and replaced by a specimen of equal or better quality.

I. Coordinate work in this section with requirements of Division 2 Technical Specifications.

1.04 PROTECTION OF EXISTING STRUCTURES

A. Underground Structures:

1. Underground structures are defined to include, but not be limited to, all sewer, water, gas, and other piping, and manholes, chambers, electrical conduits, tunnels and other existing subsurface work located within or adjacent to the limits of the Work.
2. All underground structures known to ENGINEER except water, sewer, electric, and telephone service connections are shown. This information is

shown for the assistance of CONTRACTOR in accordance with the best information available, but is not guaranteed to be correct or complete.

3. CONTRACTOR shall explore ahead of his trenching and excavation Work and shall uncover all obstructing underground structures sufficiently to determine their location, to prevent damage to them and to prevent interruption to the services which such structures provide. If CONTRACTOR damages an underground structure, he shall restore it to original condition at his expense.
4. Necessary changes in the location of the Work may be made by ENGINEER, to avoid unanticipated underground structures.
5. If permanent relocation of an underground structure or other subsurface facility is required and is not otherwise provided for in the Contract Documents, ENGINEER will direct CONTRACTOR in writing to perform the Work, which shall be paid for under the provisions of Article 11 of the General Conditions.

B. Surface Structures:

1. Surface structures are defined as all existing buildings, structures and other facilities above the ground surface. Included with such structures are their foundations or any extension below the surface. Surface structures include, but are not limited to, buildings, tanks, walls, bridges, roads, dams, channels, open drainage, piping, poles, wires, posts, signs, markers, curbs, walks and all other facilities that are visible above the ground surface.

C. Protection of Underground and Surface Structures:

1. CONTRACTOR shall sustain in their places and protect from direct or indirect injury all underground and surface structures located within or adjacent to the limits of the Work. Such sustaining and supporting shall be done carefully and as required by the party owning or controlling such structure. Before proceeding with the work of sustaining and supporting such structure, CONTRACTOR shall satisfy the ENGINEER that the methods and procedures to be used have been approved by the party owning same.
2. CONTRACTOR shall assume all risks attending the presence or proximity of all underground and surface structures within or adjacent to the limits of the Work. CONTRACTOR shall be responsible for all damage and expense for direct or indirect injury caused by his Work to any structure. CONTRACTOR shall repair immediately all damage caused by his work, to the satisfaction of the owner of the damaged structure.

D. All other existing surface facilities, including but not limited to, guard rails, posts, guard cables, signs, poles, markers, and curbs which are temporarily removed to facilitate installation of the Work shall be replaced and restored to their original condition at CONTRACTOR'S expense.

1.05 PROTECTION OF FLOORS, ROOFS, AND CEILINGS

A. CONTRACTOR shall protect floors, roofs and ceilings during the entire construction period.

B. Proper protective covering shall be used when moving heavy equipment, handling materials or other loads, when painting, handling mortar and grout and when cleaning walls and ceilings.

C. Use metal pans to collect all oil and cuttings from pipe, conduit, or rod threading machines and under all metal cutting machines.

D. Roofs and ceilings shall not be loaded without written permission of the ENGINEER.

1.05 PROTECTION OF INSTALLED PRODUCTS AND LANDSCAPING

A. Provide protection of installed products to prevent damage from subsequent operations. Remove protection facilities when no longer needed, prior to completion of Work.

B. Control traffic to prevent damage to equipment, materials and surfaces.

C. Provide coverings to protect equipment and materials from damage.
   1. Cover projections, wall corners, and jambs, sills and soffits of openings, in areas used for traffic and for passage of products in subsequent work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01563

TEMPORARY CONTROLS

PART1 - GENERAL

1.01 DESCRIPTION

A. Provide and maintain methods, equipment, and temporary construction, as necessary to provide controls over environmental conditions at the construction site and adjacent areas. Remove physical evidence of temporary facilities at completion of Work.

1.02 NOISE CONTROL

A. CONTRACTOR'S vehicles and equipment shall be such as to minimize noise to the greatest degree practicable. Noise levels shall conform to the latest OSHA standards and in no case will noise levels be permitted which interfere with the work of the OWNER or others.

1.03 DUST CONTROL

A. CONTRACTOR shall be responsible for controlling objectionable dust caused by his operation of vehicles and equipment, clearing or for any reason whatever. CONTRACTOR shall apply water or use other methods subject to the ENGINEER'S approval which will keep dust in the air to a minimum.

1.04 PEST AND RODENT CONTROL

A. Provide rodent and pest control as necessary to prevent infestation of construction or storage area.
   1. Employ methods and use materials which will not adversely affect conditions at the site or on adjoining properties.

1.05 WATER CONTROL

A. Provide methods to control surface water and water from excavations and structures to prevent damage to the Work, the site, or adjoining properties
   1. Control fill, grading and ditching to direct water away from excavations, pits, tunnels and other construction areas; and to direct drainage to proper runoff courses so as to prevent any erosion, damage or nuisance.

B. Provide, operate and maintain equipment and facilities of adequate size to control surface water.

C. Dispose of drainage water in a manner to prevent flooding, erosion, or other damage to any portion of the site or to adjoining areas and in conformance with all environmental requirements.

1.06 POLLUTION CONTROL

A. Provide methods, means and facilities required to prevent contamination of soil, water or atmosphere by the discharge of noxious substances from construction operations.

B. Provide equipment and personnel, perform emergency measures required to contain any spillages, and to remove contaminated soils or liquids.
   1. Excavate and dispose of any contaminated earth offsite, and replace with suitable compacted fill and topsoil.

C. Take special measures to prevent harmful substances from entering public waters.
   1. Prevent disposal of wastes, effluents, chemicals, or other such substances adjacent to streams, or in sanitary or storm sewers.

D. Provide systems for control of atmospheric pollutants.
   1. Prevent toxic concentrations of chemicals.
   2. Prevent harmful dispersal of pollutants into the atmosphere.

E. All CONTRACTOR'S equipment used during construction shall conform to all current federal, state and local laws and regulations.

F. The CONTRACTOR is responsible to abide by the Storm Water Pollution Prevention Plan (SWPPP) and Notice of Intent (NOI) prepared by ENGINEER to the New York State Department of Environmental Conservation (NYSDEC) prior to the start of construction of this project. Certifications are to be signed by the CONTRACTOR and all subcontractors. The SWPPP and a copy of the NOI shall be submitted to the Highway Department of jurisdiction along with a Highway Permit Application for approval.

1.07 EROSION CONTROL

A. Plan and execute construction and earthwork by methods to control surface drainage from cuts and fills, and from borrow and waste disposal areas, to prevent erosion and sedimentation.
   1. Hold the areas of bare soil exposed at one time to a minimum.
   2. Provide temporary control measures such as berms, dikes, and drains.

B. Construct fills and waste areas by selective placement to eliminate surface silts or clays, which will erode.

C. Periodically inspect earthwork to detect any evidence of the start of erosion, apply corrective measures as required to control erosion.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01575

RESPIRABLE CRYSTALLINE SILICA

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified.
The work specified shall include all labor, materials, tools, equipment, services, and incidentals necessary to work around respirable crystalline silica (RCS).

B. Related Work Specified Elsewhere.
1. Section 03300 – Concrete
2. Section 03480 – Precast Concrete Vault
3. Section 15051 – Buried Piping Installation
4. Section 15104 – Working with Asbestos Cement Pipe (ACP)
5. Section 15106 – Ductile Iron Pipe
6. Section 15109 – Prestressed Concrete Cylinder Pipe
7. Section 15140 – Testing and Disinfection

1.02 QUALITY ASSURANCE

A. Reference Standards.
1. Code of Federal Regulations U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), 29 CFR 1926.1153, Respirable Crystalline Silica.
2. New York State Department of Labor, Public Employee Safety and Health Bureau, PESH Act.
3. AWWA Manual M28, Rehabilitation of Water Mains.
4. AWWA Manual M9, Concrete Pressure Pipe.
5. NSF/ANSI Standard 61.
6. Underwriter’s Laboratories (UL).
7. International Organization for Standardization (ISO).
8. Factory Mutual Research Corporation.
9. Clean Air Act (CAA).
10. Safe Drinking Water Act (SDWA).
11. ANSI Z88.2-80, Practices for Respiratory Protection.
12. 29 CFR 1910.1200, “Hazard Communication” (OSHA).
13. 29 CFR 1910.134, “Respiratory Protection” (OSHA).
14. 29 CFR 1926, “Construction Industry” (OSHA).
15. Occupational Safety and Health Administration.
16. United States Department of Transportation (USDOT).
17. New York State Department of Environmental Conservation (NYSDEC).
18. New York State Department of Health (NYSDOH).
19. New York State Department of Labor (NYSDOL).
20. New York State Department of Transportation (NYSDOT).

1.03 SUBMITTALS

A. CONTRACTOR shall submit the following prior to the start of work:
   1. A letter from the CONTRACTOR, on company letterhead, stating that they are knowledgeable of all current local, state, and federal requirements regarding respirable crystalline silica, that all work will meet those requirements, and that all workers shall be protected against exposure as defined by OSHA. Letter shall have an original signature, signed by an officer of the company.
   2. Written exposure control plan, as defined in 29 CFR 1926.1153(g) which includes at minimum the following items:
      a. A description of the tasks in the workplace that involve exposure to respirable crystalline silica.
      b. A description of the engineering controls, work practices, and respiratory protection used to limit employee exposure to respirable crystalline silica for each task.
      c. A description of the housekeeping measures used to limit employee exposure to respirable crystalline silica.
      d. A description of the procedures used to restrict access to work areas, when necessary, to minimize the number of employees exposed to respirable crystalline silica and their level of exposure, including exposures generated by other employees or sole proprietors.

1.04 COMPETENT PERSON

A. Prior to the start of work on any given day, CONTRACTOR shall designate one individual on site as the Competent Person.

B. *Competent Person* means, in addition to the definition in 29 CFR 1926.1153(b), one who is capable of identifying existing and foreseeable respirable crystalline silica hazards in the workplace who has the authorization to take prompt corrective measures to eliminate or minimize them.

C. The Competent Person shall have the knowledge and ability necessary to fulfill the responsibilities set forth under 29 CFR 1926.1153(g).

D. The Competent Person shall be responsible for worker and job site safety as required by all relevant respirable crystalline silica regulations and OSHA requirements.

E. The name(s) and contact phone number of the competent person shall be given to the ENGINEER and OWNER before the work is to begin.

1.05 PERMITS AND COMPLIANCE

A. The CONTRACTOR shall assume full responsibility and liability for compliance with all applicable federal, state, and local laws, rules, and regulations pertaining

to work practices, protection of workers, authorized visitors to the site, and persons and property adjacent to the work areas.

1.06 PERSONAL PROTECTIVE EQUIPMENT

A. All use of Personal Protective Equipment (PPE) shall be in compliance with applicable OSHA regulations and procedures.

1.07 SIGNS AND LABELS

A. Provide warning signs and barrier tapes at all approaches to the Work area. Locate signs at such distance that personnel may read the sign and take the necessary protective steps required before entering the area.

1.08 OTHER PRODUCTS OR MATERIALS

A. Other products or materials that are required for use during work activities shall comply with local, state, and federal codes and regulations, if applicable. The CONTRACTOR is expected to furnish and utilize industry standard equipment and materials. The CONTRACTOR shall not furnish equipment or materials that have been altered in such a manner that violates local, state, and/or federal codes and regulations, or presents unnecessary health and safety risk.

PART 2 – MATERIALS – NOT USED

PART 3 - EXECUTION

3.01 WORK PROCEDURES

A. The Competent Person shall be on site at all times Work is progressing.

B. All Work shall be performed in such a manner as to minimize the risk of exposure to personnel and to minimize the risk of release of respirable crystalline silica or respirable crystalline silica-containing debris to the environment.

C. All Work shall be performed in strict accordance with the Project Documents and all governing codes, rules, and regulations. The information contained within this specification section will be considered part of the Project Documents. Where conflicts occur between the Project Documents and applicable codes, rules, and regulations, the more stringent procedure(s) shall apply.

D. The CONTRACTOR shall take notice, and make employees aware, of occupational safety hazards associated with the work being performed on-site.

3.02 PROHIBITED WORK PRACTICES AND ENGINEERING CONTROLS

A. CONTRACTOR shall not use procedures that subject silica sources to forces that will crumble, pulverize, or reduce to powder the silica sources.

B. The following work practices and engineering controls shall **not** be used on silica sources during construction:

1. High-speed abrasive disc saws and sanders not equipped with point of cut ventilator or enclosures with HEPA filtered exhaust air.
2. Carbide-tipped cutting blades.
3. Electrical drills, chisels, and rasps used to make field connections in concrete pipe.
4. Shell cutters used to cut entry holes in concrete pipe.
5. A hammer and chisel without using wet techniques to remove pipe connections.
6. Compressed air used to remove dust or other debris containing respirable crystalline silica.
7. Dry sweeping, dry shoveling, or other dry clean-up of dust.
8. Employee rotation as a means of reducing employee exposure to respirable crystalline silica.
9. Fans or other air handling techniques used to deliberately move the respirable crystalline silica to other locations or away from the work site.

3.03 PAYMENT

A. All costs for work involving respirable crystalline silica are included in the various bid items of the Contract.

END OF SECTION

SECTION 01640

TRANSPORTATION AND HANDLING OF MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A. CONTRACTOR shall make all arrangements for transportation, delivery and handling of equipment and materials required for prosecution and completion of the Work. Included in CONTRACTOR'S work shall be acceptance of consignment and coordination of equipment deliveries for equipment purchased by OWNER.

B. Shipments of materials to CONTRACTOR or Subcontractors shall be delivered to the site only during regular working hours. Shipments shall be addressed and consigned to the CONTRACTOR giving name of Project, street number and city. Shipments shall not be delivered to OWNER except where otherwise directed.

C. If necessary to move stored materials and equipment during construction, CONTRACTOR shall move or cause to be moved materials and equipment without any additional compensation.

1.02 DELIVERY

A. Arrange deliveries of products in accordance with construction schedules and in ample time to facilitate inspection prior to installation.

B. Coordinate deliveries to avoid conflict with Work and conditions at site and to accommodate the following:
   1. Work of other contractors, or OWNER.
   2. Limitations of storage space.
   3. Availability of equipment and personnel for handling products.
   4. OWNER'S use of premises.
   5. Work under other construction projects on OWNER'S site.

C. Do not have products delivered to project site until related Shop Drawings have been approved by the ENGINEER.

D. Do not have products delivered to site until required storage facilities have been provided.

E. Have products delivered to site in manufacturer's original, unopened, labeled containers. Keep ENGINEER informed of delivery of all equipment to be incorporated in the Work.

F. Partial deliveries of component parts of equipment shall be clearly marked to identify the equipment, to permit easy accumulation of parts and to facilitate assembly.

G. Immediately on delivery, inspect shipment to assure:
   1. Product complies with requirements of Contract Documents and reviewed submittals.
   2. Quantities are correct.
   3. Containers and packages are intact, labels are legible.
   4. Products are properly protected and undamaged.

1.03 PRODUCT HANDLING

A. Provide equipment and personnel necessary to handle products by methods to prevent soiling or damage to products or packaging.

B. Provide additional protection during handling as necessary to prevent scraping, marring or otherwise damaging products or surrounding surfaces.

C. Handle products by methods to prevent bending or overstressing.

D. Lift heavy components only at designated lifting points.

E. Materials and equipment shall at all times be handled in a safe manner and as recommended by manufacturer or supplier so that no damage will occur to them. Do not drop, roll or skid products off delivery vehicles. Hand carry or use suitable materials handling equipment.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01731

CONNECTIONS TO EXISTING FACILITIES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Perform all construction necessary to complete connections and tie-ins to existing facilities.

B. Keep existing facilities in operation unless otherwise specifically permitted in these Specifications or approved by OWNER.

C. CONTRACTOR shall perform all construction activities so as to avoid interference with operations of the facility and the work of others, and the safety and quality of the finished water.

D. Related work specified elsewhere:
   1. Section 01311, Coordination with OWNER'S Operations.
   2. Divisions 2-15, Technical Specifications.

1.02 GENERAL INFORMATION

A. Construction of interconnections is subject to CONTRACTOR'S submittal of materials, detailed procedures, schedules, etc. required by the contract. The following is for information only and the CONTRACTOR is responsible for all interconnections and abandonments.

B. The CONTRACTOR shall not operate existing valves. Once a new watermain is placed into service, CONTRACTOR shall not operate those valves.

C. The OWNER only shall operate existing valves. The CONTRACTOR is advised that watertight conditions may not exist when existing valves are closed. The CONTRACTOR shall consider this in his bid.

D. The CONTRACTOR shall perform test pits at existing pipes, valves, etc. as shown on the drawings or directed. Watermain installation and the pipe laying schedule should reflect the field information obtained by the test pits. The stationing of tees, fittings and valves should be coordinated with the test pit information in order to facilitate construction of the new watermains and construction of the interconnections.

E. The CONTRACTOR shall submit to the ENGINEER his proposed interconnection details, procedures and schedules.

F. The CONTRACTOR shall notify all affected customers of any shut-down at least 48 hours in advance.

G. The CONTRACTOR shall notify appropriate fire stations 48 hours in advance prior to taking any fire hydrants out of service. Any hydrant not in service shall be bagged in burlap.

H. Any shut-down shall be limited to 4 consecutive hours.

I. The CONTRACTOR shall have all equipment, manpower, and materials required for the construction on site and ready for use and/or prior to commencing any shut-down or removing any existing facilities.

J. The CONTRACTOR shall schedule and coordinate his work with others in accordance with the specifications and shall coordinate all proposed shut-downs with the ENGINEER and OWNER. The work shall be scheduled through the ENGINEER so that the OWNER has a minimum of three (3) working days advance notice.

K. Only one interconnection will be allowed until the proposed watermain and end of line valves (if applicable) have been installed, tested and disinfected and the ENGINEER authorizes the interconnections.

L. Caps (or plugs) on iron pipe shall be mechanically restrained watertight caps (or plugs) compatible with the pipe being capped and suitable to resist thrusts due to operating pressures.

M. Temporary caps shall be watertight and shall remain in place until the actual interconnections are made.

N. In unpaved areas, all interconnection joints shall remain exposed and tested under operating pressure for a 24-hour period.

O. If no leaks occur, the exposed interconnection piping can, upon ENGINEER'S authorization, be backfilled.

P. The CONTRACTOR shall dewater trenches, existing mains, etc. as required to perform the interconnections.

Q. The CONTRACTOR shall submit his detailed procedures for his interconnection sequence to the ENGINEER.

R. If the CONTRACTOR wishes to propose construction of several interconnections at one time, he shall submit a written, detailed proposal to the ENGINEER.

S. No work shall begin on the interconnections until the ENGINEER authorizes the work.

T. Firms performing taps on existing waterlines shall be acceptable to the OWNER.

U. All joints at interconnections shall be mechanically restrained.

V. New hydrants shall remain bagged in burlap (except for flushing and/or testing) until placed into service.

W. The interconnections and abandonment items include all costs to comply with permits, regulatory agencies, etc., not included under other bid items.

X. Removals shall be made with caution to prevent damage to hydrants, valves, etc., being removed.

Y. At all valves being abandoned: locate the valve, close the valve, remove the valve box, backfill and restore as required.

Z. CONTRACTOR will provide a temporary bypass for water service for all businesses, schools, and other establishments as defined by ENGINEER. No disruption in water service for these establishments will be permitted at any time during construction.

1.03 SCHEMATIC DRAWINGS

A. The schematic drawings included on the plans are not to scale and only indicate the general arrangement of the interconnections and abandonments.

B. In general, heavy lines indicate proposed improvements, pipe, fittings, etc. and light lines indicate existing facilities.

C. The schematic drawings do not show other features (such as other underground utilities, etc.) which could affect the work.

D. The CONTRACTOR shall, at his expense, verify all field conditions.

E. Restrained mechanical joint solid sleeves or restrained flexible sleeve type couplings will be required to connect the proposed pipe to existing pipe, where applicable.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 02080

FIRE HYDRANTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

The work specified shall include all labor, material, equipment, tools, services and incidentals necessary to furnish and install hydrants and valve assemblies as shown, specified and required.

B. Related Work Specified Elsewhere

1. Section 02316 - Select Granular Materials
2. Section 02351 - Excavation, Backfill and Trenching
3. Section 15051 - Buried Piping Installation
4. Section 15106 - Ductile Iron Pipe, Fittings and Accessories
5. Section 15110 - Valves and Appurtenances
6. Section 15140 - Testing and Disinfection

1.02 QUALITY ASSURANCE

A. Manufacturer's Qualifications

1. Manufacturer shall have a minimum of 5 years experience producing fire hydrants and shall show evidence of at least 5 installations in satisfactory operation.

B. Parts Interchangeability

1. Hydrants and appurtenances provided under this Section shall be the standard product in regular production by manufacturers whose products have proven reliable in similar service for at least five years.
2. Parts Interchangeability: It is the intent of these specifications that all materials furnished herein shall be compatible with similar materials of other manufacturers.

C. Reference Standards

1. ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
2. ASTM A354, Specification for Quenched and Tapered Alloy Steel Bolts, Studs, and Externally Threaded Fasteners
3. AWWA C502, Standard for Dry-Barrel Fire Hydrants
4. NSF/ANSI Standard 61
5. Underwriter's Laboratories (UL)
6. International Organization for Standardization (ISO)
7. Factory Mutual Research Corporation

1.03 SUBMITTALS

A. Shop Drawings: Submit for approval the following:
   1. Manufacturer's literature, illustrations, specifications, detailed drawings, data and descriptive literature on all fire hydrant materials.
   2. Engineering data including dimensions, materials, size and weight.

B. Operation and Maintenance Data: Submit complete manuals including:
   1. Copies of all Shop Drawings, test reports, maintenance data and schedules, description of operation, and spare parts information.

C. Certificates:
   1. Where specified or otherwise required by ENGINEER, submit test certificates.
   2. The CONTRACTOR shall submit certificates of compliance with the applicable referenced standards.
   3. Submit certificate of compliance with NSF/ANSI Standard 61 for all products under this Section, including interior coatings, by an independent, authorized laboratory.

D. Delivery Tickets:
   1. Furnish delivery tickets indicating the manufacturer, identifying that the fire hydrant was new and from a manufacturer that has been submitted and approved.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. During delivery and handling, all materials shall be braced and protected from any distortion or damage; any such distortion or damage shall be basis for rejection of the materials.

B. Equipment used for unloading shall be covered with wood or rubber to avoid damage to the exterior of the materials. Do not drop or roll materials off trucks. All hydrants and valves shall be handled with padded slings or other appropriate equipment. The use of cables, hooks or chains will not be permitted.

C. The materials shall be inspected before and after unloading. Materials that are found to be cracked, gouged, chipped, dented or otherwise damaged will not be accepted.

D. Interiors of hydrants and valves shall be kept free from dirt and foreign matter.

E. Store all hydrants, valves and appurtenances on heavy wood blocking or platforms so they are not in contact with the ground.

F. Hydrants shall be unloaded opposite to or as close to the place where they are to be laid as is practical to avoid unnecessary handling.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General

1. All products, including interior coatings, shall be suitable for use in a potable water system.
2. Interior coating shall be certified to meet NSF/ANSI Standard 61.
3. All materials shall be suitable for use in potable water systems.
4. All hydrants shall have manufacturer's name cast in raised letters on hydrant body.
5. All bolts required to connect buried valves shall be Type 304 stainless steel or fluorocarbon coated, high strength corrosion resistant low alloy steel.
6. All other bolts, nuts and studs shall, unless otherwise specified, conform to ASTM A307, Grade B; or ASTM A354.
7. Bolts and nuts shall have hexagon heads and nuts.
8. Gasket material and installation shall conform to manufacturer's recommendations.
9. Hydrant shut-off gate valve (auxiliary valve) shall be resilient seat as specified in Section 15110, Valves and Appurtenances.
10. All hydrants, valves, and appurtenances must be new materials in first-class condition. Used or recycled materials will not be allowed, regardless of condition.

B. Hydrants

1. Hydrant shall be cast iron body, break-away type barrel, "O" ring operating stem seal and a 300 psi test pressure with a minimum 150 psi working pressure, in accordance with AWWA Standard C-502, latest revision.
2. All operating parts, including brass valve seat, shall be removable through the barrel without excavation.
3. Hydrant shall be compression type, with valve opening not less than 5-$^1/_4$ inches, with readily removable brass seats and non-rising stems. Valve shall open against pressure and shall close with pressure. Valve opening limit stops shall be in the shoe of the hydrant.
4. Hydrant shall have two 2-$^1/_2$-inch hose nozzles and one 4-$^1/_2$-inch steamer connection with National Standard threads and operating nuts.
5. Hydrants shall be designed to allow 5 feet of cover on the branch and allow 15-inches to 18-inches between the centerline of the lowest nozzle and the surface of the ground.
6. Operating nuts and caps shall be 1-$^3/_8$ inch square and shall turn right (clockwise) to close. Nozzle caps shall be chained to the barrel.
7. Hydrant piping shall be 6-inch restrained ductile iron pipe mechanical joint or anchor pipe unless otherwise specified.

8. Weep holes shall be provided for drainage and remain unplugged. If required by the OWNER, weep holes are to be plugged and the hydrant pumped dry after all flushing, testing, and other filling operations.

C. Acceptable Manufacturers
1. Kennedy - Guardian,
2. Mueller - Centurion,
3. Clow-Medallion,
4. American AVK Model 2780.

2.02 PAINT

A. All interior wetted surfaces of fire hydrants except finished or bearing surfaces shall be shop painted in accordance with NSF/ANSI Standard 61 specifications for potable water and applied in accordance with the manufacturer's recommendations. Exterior surfaces shall be factory painted with touch-up paint applied in field, as necessary, meeting the following criteria:
1. OSHA safety yellow.
2. Conforming to Federal lead standards.
3. Polyurethane modified alkyd.
4. Solids by weight 67.5%.
5. Solids by volume 46%.
6. Paint shall not be supplied in spray-can container.
7. Manufacturers: Dutch Standard DEF1-Rust Enamel #448, Rust-Oleum #944, Pennsbury Hydrant-Hide #9032, Con-Lux Steel Guard #8504 Caution Yellow and Bruning Silathane #52035 Yellow, or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General
1. Install all hydrants and components in accordance with manufacturer's instructions.
2. The hydrant shall be set plumb with the center of the lowest nozzle between 15 inches and 18 inches above the finished grade or as specified by the ENGINEER. The pumper nozzle shall be oriented normal to the near edge of pavement.
3. The auxiliary valve shall be located as close to the main line as possible and at no time shall the center of the hydrant to the center of the auxiliary valve be less than 36 inches. The valve shall not be placed in pavement.
4. No part of the hydrant shall be closer than 2 feet to the face of the curb or 5 feet to the edge of the pavement where no curb exists or as per governing municipalities requirements.
5. All pipe connecting the main to the hydrant stem shall be 6 inch ductile iron pipe, fully restrained by use of anchor pipe or mechanical restraints as

specified. Use of tie-rods shall be restricted to restraining existing conditions.

6. A drain pocket of clean No. 1 stone shall be provided as shown on the Drawings.
   a. The granular material shall be extended above the hydrant drain.
7. Grease all hydrant nozzle threads after installation. The upper stem shall be lubricated with oil or grease. If grease is used, provide alemite fittings. Lubricate areas to be sealed from wet areas with "O" rings. Grease used shall be a food grade compound specially formulated for fire hydrants.
8. Install concrete block during hydrant installation for thrust restraint.

B. Inspection

1. All hydrants and valves will be inspected by the ENGINEER prior to installation. Damaged or defective materials will be rejected whether previously incorporated into the work or not.
2. Prior to the work in this section, the CONTRACTOR shall inspect the installation area to determine if the work of other trades has progressed to the point where the installation may properly commence.
3. The CONTRACTOR shall verify that the installation can proceed in accordance with all pertinent codes and regulations, the original design and the referenced standards.

C. Discrepancies

1. If the above referenced inspection reveals discrepancies, the CONTRACTOR shall notify the ENGINEER immediately.
2. The CONTRACTOR shall not proceed with the installation in areas of discrepancy until said discrepancy is resolved.

3.02 PAINTING

A. All interior wetted surfaces of fire hydrants except finished or bearing surfaces shall be shop painted in accordance with NSF/ANSI Standard 61 for potable water and applied in accordance with the manufacturers recommendations. Exterior surfaces shall be factory painted yellow and shall be repainted yellow in the field after installation with paint meeting the requirements of this specification.

3.03 TESTING

A. All parts and components shall be adjusted as required to provide correct operation.

B. The CONTRACTOR shall demonstrate to the ENGINEER'S satisfaction that all system components operate correctly, both individually and as a system. All testing equipment required shall be provided by the CONTRACTOR.

C. CONTRACTOR will replace fire hydrant assemblies, which are leaking or are considered suspect by the ENGINEER.

END OF SECTION

SECTION 02316

SELECT GRANULAR MATERIALS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified
Select granular materials shall be used in bedding, pipe encasement, or backfill and as specified or as directed by the ENGINEER.

B. Related Work Specified Elsewhere
1. Section 02351 - Excavation, Backfill and Trenching
2. Section 15051 - Buried Piping Installation

1.02 QUALITY ASSURANCE

A. Reference Standards
1. NYSDOT Standards, latest revision

1.03 SUBMITTALS

A. The CONTRACTOR shall furnish representative samples, sieve analysis and certification of specification compliance for the select granular materials to the ENGINEER and advise on the location of the source.

B. The CONTRACTOR shall submit copies of proposed materials, methods and operations of backfilling and compaction to the ENGINEER for review prior to the start of work. A list of equipment to be used in CONTRACTOR'S Methods and Operations must be included.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Bedding and Pipe Encasement
1. NYSDOT No. 1 Crushed Stone or Crushed Gravel – bedding for PVC, DIP, HDPE, and PCCP watermain.
Thoroughly washed, clean, sound, tough, hard, crushed limestone conforming to the requirements of NYSDOT Item No. 703.0201 or crushed gravel conforming to the requirements of NYSDOT Item No. 703.0202, having the following gradation by weight:

% Passing	Sieve
100	1-inch
90 - 100	1/2-inch
0 - 15	1/4-inch

2. NYSDOT No. 2A Crushed Stone or Crushed Gravel – bedding for DIP and PCCP watermain.
Shall be a No. 1 and No. 2 blend, thoroughly washed, clean, sound, tough, hard, crushed limestone conforming to the requirements of NYSDOT Item No. 703.0201 or crushed gravel conforming to the requirements of NYSDOT Item No. 703.0202, having the following gradation by weight:

% Passing	Sieve
100	1-1/2-inch
93-100	1-inch
27-58	1/2-inch
0-8	1/4-inch

3. NYSDOT Concrete Sand – bedding for copper and polyethylene tubing.
Washed, fine aggregate sand shall conform to the requirements of NYSDOT Item No. 703.07, having the following gradation by weight:

% Passing	Sieve
100	3/8-inch
90 - 100	No. 4
75 - 100	No. 8
50 - 85	No. 16
25 - 60	No. 30
10 - 30	No. 50
1 - 10	No. 100
0 - 3	No. 200

B. Select Backfill

1. NYSDOT Subbase Type 2 Crusher Run Stone or Crusher Run Gravel.
Material shall conform to the requirements of NYSDOT Item No. 304.12, having the following gradation by weight:

% Passing	Sieve
100	2-inch
25 - 60	1/4-inch
5 - 40	No. 40
0 - 10	No. 200

C. Peagravel

1. NYSDOT Type 1A Screened Gravel for the annular space between the carrier pipe and the casing pipe.
   Screened gravel shall conform to the requirements of NYSDOT Item No. 703.0203 and have the following gradation by weight:

% Passing	Sieve
100	1/2-inch
90 - 100	1/4-inch
0 - 15	1/8-inch

D. Follow NYSDOT Standard Specifications if gradation data varies from those listed above.

E. Recycled concrete or asphalt pavement shall not be allowed.

F. Slag of any type shall not be allowed.

G. Flowable fill shall not be allowed.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General

1. Select granular material as specified or directed for watermain bedding or encasement shall be placed in accordance with Section 02351 - Excavation, Backfill and Trenching and Section 15051 - Buried Piping Installation.
2. Select backfill where specified or directed shall be placed in accordance with the backfilling provisions of Section 02351 - Excavation, Backfill & Trenching.

3.02 DISPOSAL OF DISPLACED MATERIALS

A. Materials displaced through the use of the above materials shall be wasted or disposed of by the CONTRACTOR and the cost of such disposal shall be included in the appropriate bid item.

END OF SECTION

SECTION 02317

ROCK EXCAVATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified
   1. The CONTRACTOR shall furnish all labor, materials, equipment, and incidentals necessary for rock excavation for construction of structures and pipelines as shown and specified. Disposal of excess and unsuitable excavated rock material is included in this item.
   2. This item includes backfill of rock excavations with acceptable materials as defined in other Related Work.

B. Related Work Specified Elsewhere
   1. Section 02316 - Select Granular Materials
   2. Section 02351 - Excavation, Backfill and Trenching
   3. Section 15051 - Buried Piping Installation

1.02 SUBMITTALS

A. Before any rock removal begins, the CONTRACTOR shall obtain all permits and licenses required by governing authorities having jurisdiction and supply certified copies to the ENGINEER.

B. Submit procedures and list equipment to be used.

PART 2 - PRODUCTS

2.01 DEFINITIONS

A. Rock shall be defined as hard cap rock or boulders exceeding one (1) cubic yard in volume and solid ledge rock which, in the opinion of the ENGINEER, requires drilling and blasting or jackhammering for its removal.

B. The following materials will not be measured nor allowed for payment as rock excavation:
   1. Soft, weathered or disintegrated rock which can be removed by normal excavation equipment.
   2. Loose or previously blasted rock.
   3. Broken stone in rock fills.
   4. Any rock which may fall into the excavation trench from outside the limits of excavation specified.

PART 3 - EXECUTION

3 .01 GENERAL

A. Limits of Rock Excavation
   1. Structures:
      a. The lowest elevation of the structure, manhole, pump station, plus bedding etc. at each location or as directed by the ENGINEER.
      b. Vertical planes located 12 inches outside the footing or as shown on the Contract Drawings.
      c. As ordered by ENGINEER.
   2. Pipe Trenches: The width of trenches shall be the outside diameter of the pipe plus 2 feet, exclusive of bells, branches, hubs, spurs or cradles. The sides of the trench shall be vertical.
      a. The depth of the trench shall be the depth on the bottom of the pipe exclusive of bells and branches plus bedding.
      b. The length shall be equal to the laid length of pipe, measured horizontally.
      c. Additional width in pipe trenches at field joints or beyond the lines described above will be considered outside the limits described.
      d. As ordered by the ENGINEER.

B. When there is a separate pay bid item for rock excavation, the rock shall be uncovered prior to removal in sections acceptable to the ENGINEER so that it may be measured.

C. When there is not a separate pay bid item for rock excavation, the rock shall be uncovered prior to removal in sections acceptable to the ENGINEER for observation and for record.

3.02 METHODS OF REMOVAL

A. Hand removal
   1. The CONTRACTOR shall remove rock by hand methods such as drilling, jack-hammering and mechanical excavation.
   2. Under no circumstances will blasting be allowed. Explosive materials used primarily for blasting operations are not allowed on site.

3.03 DISPOSAL

A. Backfill
   1. Pieces of rock larger than 4 inches shall not be used in backfilling pipe trenches.
   2. Rock backfill shall not be placed within two feet of the outside diameter of pipes.
   3. The quantity of rock used in any backfill location shall not be so great as to result in voids, as determined by the ENGINEER.

4. Rock backfill shall not be placed within 18 inches of the surface of finish grade.
5. Excess or unacceptable rock may be disposed of on the site only where shown or specified by the ENGINEER. Rock which cannot be disposed of on the site shall be removed and disposed of off the site at the CONTRACTOR'S expense and in compliance with all applicable federal, state and local regulations.

B. The rock excavated, which cannot be incorporated into the backfill material, as specified, shall be disposed of as spoil and shall be replaced with the quantity of acceptable material for backfilling.

END OF SECTION

SECTION 02351

EXCAVATION, BACKFILL, AND TRENCHING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified
   1. The CONTRACTOR shall furnish all labor, materials, equipment, and incidentals necessary for excavation, trenching, backfill, and compaction as shown and specified. Disposal of excess and unsuitable excavated material is included.
   2. Backfill of excavations with acceptable materials as specified in other Sections.

B. Related Work Specified Elsewhere
   1. Section 02316 - Select Granular Materials
   2. Section 02317 - Rock Excavation
   3. Section 02900 - Restoration
   4. Section 15051 - Buried Piping Installation

1.02 QUALITY ASSURANCE

A. Reference Standards
   1. ASTM A36, Structural Steel
   2. ASTM A328, Steel Sheet Piling
   3. ASTM D422, Particle-Size Analysis of Soils
   4. ASTM D698, Moisture-Density Relations of Soils, using 5.5 lb. Rammer and 12-inch Drop
   5. ASTM D1556, Density of Soil in Place by the Sand-Cone Method
   6. ASTM D1557, Moisture-Density Relations of Soils, using 10 lb. Rammer and 18-inch Drop
   7. ASTM D2321, Recommended Practices for Underground Installation of Pipe for Sewers and Other Gravity Flow Applications
   8. ASTM D2922, Density of Soil and Soil-Aggregate in Place by Nuclear Method (Shallow Depth)
   9. AISC Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings
   10. Occupational Safety and Health Administration (OSHA) Regulations
   11. Industrial Code Rule 23

1.03 SUBMITTALS

A. Before any excavation begins, the CONTRACTOR shall obtain all permits and licenses required by governing authorities having jurisdiction and submit certified copies to ENGINEER prior to work being performed.

B. The CONTRACTOR shall submit drawings submitted with a PE stamp, for information only, for the following items as required:
   1. Sheeting, shoring and bracing
   2. Dewatering systems
   3. Cofferdams
   4. Additional protection systems required
   5. Underpinning
   6. Underdraining
   7. Sediment and Erosion control
   8. Boring and Receiving Pits.

C. The CONTRACTOR shall submit proposed materials, methods and operations of backfilling and compaction to the ENGINEER for review prior to the start of work. A list of equipment to be used in CONTRACTOR'S methods and operations must be included.

D. All drawings shall be prepared and sealed by an independent professional engineer recognized as an expert in the specialty involved and licensed to practice in the State of New York. The drawings shall be submitted to the ENGINEER to establish compliance with the terms of the Contract Documents. Calculations shall not be submitted. Drawing submissions will not be checked and will not imply approval by the ENGINEER of the work involved. CONTRACTOR shall be wholly responsible for designing, installing, and operating whatever system is necessary to accomplish satisfactory sheeting, bracing, protection, underpinning, and dewatering.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Bedding and Select Backfill
   1. Bedding and select backfill material shall be in accordance with Section 02316 - Select Granular Materials.

B. Backfill and Fill Materials
   1. Excavated materials may be used for backfill provided:
      a. Material is sandy, loamy or similar to bank run gravel.
      b. Material is free of debris, hazardous materials, frozen materials, organic or other deleterious materials. Material greater than 4-inches in any direction is unacceptable. Material greater than 2-inches in any direction is unacceptable for backfill directly against the watermain.
      c. Maximum dry density and optimum moisture content are determined in accordance with the above.
      d. Material is reviewed and deemed acceptable by the ENGINEER.
   2. Use select granular backfill within 5 feet or within a 1 on 1 slope from the trench to the edge of pavement of all roadways.

C. Topsoil
   1. Topsoil shall be furnished and installed and coordinated with Section 02900, Restoration.

D. Explosives
   1. Explosives are not allowed to be used nor allowed on site.

E. Sheeting, Shoring & Bracing
   1. Used material shall be in good condition, not damaged or excessively pitted. Unless otherwise specified, all sheeting to remain in place shall be new. New or used sheeting may be used for temporary work.
   2. All timber used for breast boards (lagging) shall be new or used, meeting the requirements for Douglas Fir Dense Construction grade or Southern Pine No. 2 Dense S3. Where close or tight sheeting is required, wood sheeting shall be tongued and grooved.
   3. All steel work for sheeting, shoring, bracing, cofferdams, etc. shall be designed in accordance with the provisions of the "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings", of the AISC except that field welding will be permitted.
   4. Steel sheet piling shall be manufactured from steel conforming to ASTM A328. Steel soldier piles, wales and braces shall be new or used and shall conform to ASTM A36.
   5. Steel sheeting shall have a minimum thickness of $^{3}/_{8}$-inch in web, unless otherwise specified.

PART 3 - EXECUTION

3.01 INSPECTION

A. The CONTRACTOR shall provide the ENGINEER with sufficient time and means to examine the areas and conditions under which excavating, filling and grading are to be performed. The CONTRACTOR shall notify the ENGINEER of conditions detrimental to the proper and timely completion of work. The CONTRACTOR shall not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to the ENGINEER.

3.02 TEST PITS

A. Where shown or ordered by the ENGINEER, the CONTRACTOR shall excavate and backfill test pits in advance of construction to determine conditions or location of existing facilities. The CONTRACTOR shall perform all work required in connection with excavating, stockpiling, maintaining, sheeting, shoring, backfilling and restoring the surface for the test pits.

B. Test pits which the CONTRACTOR excavates that are not shown on the Drawings or specified or ordered shall be at the CONTRACTOR'S expense.

C. No test pits will be dug prior to utility company stakeout.

D. Cold patch for temporary repair shall be placed as directed by the ENGINEER.

3.03 EROSION CONTROL

A. All necessary precautions shall be taken to preclude the contamination of any wetland or waterway by suspended solids, sediment, fuels, solvents, lubricants, epoxy coatings, paints, concrete leachate or any other environmentally deleterious substance associated with the project.

B. All necessary precautions shall be taken to prevent the entry of raw concrete or concrete liquors into the waters and/or wetlands of the State of New York. Equipment washwater from this project shall not be allowed to enter any waterway or wetland.

C. All sediments are to be retained on the project site through the use of hay bales, silt fences or other barriers, as specified or approved by the local authority having jurisdiction, to prevent erosion.

D. All areas of soil disturbance resulting from this project shall be seeded with an appropriate perennial grass seed and mulched with hay or straw within one week of final grading. Mulch shall be maintained until a suitable vegetative cover has been established.

E. Pumped groundwater collected from excavations shall not be allowed to be discharged directly to any wetland, waterway, or other water body.

F. Contamination of any wetland, waterway, or other water body shall be cleaned and/or restored to the satisfaction of the ENGINEER and governing authorities at the expense of the CONTRACTOR.

3.04 EXCAVATION

A. The CONTRACTOR shall perform all excavation required to complete the work as shown and specified. Excavations shall include earth, sand, clay, gravel, hardpan, boulders and ledge rock, decomposed rock, pavements, rubbish and all other materials within the excavation limits, except rock. Where the excavation is in rock meeting the definition in Section 02317 - Rock Excavation (requiring drilling, jack-hammering and hand removal), the rock shall be removed as specified in Section 02317.

B. Excavations for pipelines, utilities and structures shall be open excavations, shored and braced where necessary, according to OSHA standards, to prevent possible injury to workmen and to new and existing structures or pipelines.

C. Where the pipeline, utility or structure is to be placed below the ground water table, well-points, cofferdams or other acceptable methods shall be used to permit

construction under dry conditions. Dry conditions shall prevail until concrete has reached sufficient strength to withstand earth and hydrostatic loads and until the pipelines are properly jointed, tested and backfilled.

D. Pumping in excavations shall be done in such a manner so as to prevent damage to the existing subgrade, and to prevent the carrying away of unsolidified concrete materials.

E. Excavations for pipelines shall be made sufficiently wide to permit proper laying and jointing of the pipe. The trench width at the top of the pipe should not be greater than the outside diameter of the pipe barrel plus 2 feet, but shall be sufficient to allow thorough compacting of earth refill adjacent to the bottom half of the pipe. The depth of trench shall be sufficient to allow a minimum cover over the top of the pipe as shown on the drawings. The use of excavating equipment which requires the trench to be excavated to an excessive width will not be allowed. All trenches for buried piping shall be excavated at least 6 inches below the bottom of the pipe and backfilled with pipe bedding material as specified in Section 02316 – Select Granular Materials.

F. Acceptable excavated materials shall be stockpiled in specified areas until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.

1. Locate and retain soil materials away from edge of excavations.
2. Unsuitable backfill material shall be kept separate from all other material and shall be disposed of as specified hereinafter. Disposal of unsuitable and excess excavated material shall be accomplished immediately upon removal from the excavation.
3. Stockpiles shall not be located such that they interfere with traffic or access to public or private property. If necessary, the CONTRACTOR shall maintain additional stockpile areas located elsewhere on the site, and shall transport the suitable backfill material to and from such stockpile areas as required for the work.
4. In built-up districts and in streets where traffic conditions render it necessary, the material excavated from the initial opening shall be removed by the CONTRACTOR as soon as excavated, and the material subsequently excavated, if suitable for the purpose, shall be used to backfill the trenches in which pipe has been laid or structures have been built, and neither the excavated material nor materials of construction shall be stored on the streets or sidewalks.

G. If the material at the design grade is unsuitable as determined by the ENGINEER, the CONTRACTOR, when ordered in writing, shall excavate additional material to the depth necessary and shall backfill to the proposed grade with select granular material.

H. Unless otherwise directed or permitted, not more than 100 feet of trench in advance of the end of the completed pipe or structure therein shall be opened at any time. Every trench in rock shall be fully opened at least 30 feet in advance of any place

where masonry or pipe is being laid. Any time when the CONTRACTOR'S crews are not on the job working, a trench length equal to or less than one-half of the last length of pipe installed may be left open, but properly covered or barricaded to protect the public.

I. At such locations where two pipes may be installed in parallel in a common trench, and where specified, the CONTRACTOR shall install the pipes a minimum of 2 feet apart as measured horizontally from the outside diameter of pipe.

3.05 UNAUTHORIZED EXCAVATION

A. All excavation outside the lines and grades shown and not specified, together with the removal and disposal of the associated material shall be at the CONTRACTOR'S expense. The unauthorized excavation shall be filled as directed by the ENGINEER with select compacted backfill at the CONTRACTOR'S expense. Claims and damages resulting from the CONTRACTOR'S unauthorized excavation will be his sole responsibility.

3.06 DRAINAGE AND DEWATERING

A. General

1. Prevent surface and subsurface water from flowing into excavations and from flooding adjacent areas.
2. Remove water from excavation as fast as it collects.
3. Maintain the ground water level at least 2 feet below the bottom of the excavation to provide a stable surface for construction operations and to prevent damage to the work during all stages of construction.
4. Provide and maintain pumps, sumps, suction and discharge lines and other dewatering system components necessary to convey water away from excavations.
5. Provide sediment traps when water is conveyed into water courses.
6. Notify the ENGINEER before shutting down dewatering systems for any reason.
7. Standing water shall not be permitted in the excavation at any time. If the material at the design grade becomes unsuitable or contaminated due to the actions of the CONTRACTOR, the CONTRACTOR shall excavate additional material to the depth necessary and shall backfill to the proposed grade with select fill or crushed stone.
8. 100% stand-by pumps (gasoline powered) shall be maintained at the site at all times.
9. Any hardships created by the temporary dewatering for this Contract which adversely affects the water supply to local property owners, shall be satisfactorily resolved by the CONTRACTOR, including the provision of temporary water service, if required, at no additional cost to the OWNER.
10. Obtain required permits from agencies of jurisdiction, NYSDEC, and USACOE, for any water being discharged into rivers, streams, or water courses.

B. Disposal of Water Removed by Dewatering Systems

1. Dispose of all water removed from the excavation in such a manner as not to endanger public health, property, or any portion of the work under construction or completed.
2. Dispose of water in such a manner as to cause no inconvenience to the owner or others on or adjacent to the site.
3. Convey water from the excavation in a closed conduit. Do not use trench excavations as temporary drainage ditches.
4. Disposal of water shall be by specified methods and shall not cause erosion or sedimentation to occur in existing drainage systems. All sedimentation or blocking of existing systems shall be thoroughly cleaned and returned to original condition by the CONTRACTOR at his expense.
5. Damage caused by the CONTRACTOR'S operations to public or private property shall be repaired by him to the satisfaction of the ENGINEER and the damaged property owner at the CONTRACTOR'S expense.
6. The CONTRACTOR shall perform all work, furnish all materials and install all measures required to reasonably control soil erosion resulting from construction operations and prevent excessive flow of sediment from the construction site. Such work may include the installation of water diversion structures, diversion ditches and sediment basins and seeding, mulching or sodding critical areas to provide temporary protection. The CONTRACTOR shall submit a plan showing the methods to be used for controlling erosion and sedimentation during construction along with the schedule of construction operations to the ENGINEER for review.
7. All erosion and sediment control practices shall be in place prior to any grading operations and installation of proposed structures or utilities.
8. All erosion and sediment control practices shall be left in place until construction is completed and\or area is stabilized.
9. Where necessary, disturbed areas shall be temporarily seeded and\or mulched until proper weather conditions exist for establishment of a permanent vegetative cover.

3.07 SHEETING, SHORING, AND BRACING

A. General

1. Unless otherwise shown or specified, excavations shall be open, shored and braced or sheeted where necessary to prevent injury to workmen, structures, pipelines and utilities.
2. Structures within 100 feet of sheeting installations shall be subject to a pre-construction survey to identify and record existing structural conditions. In the instance of private residencies, the homeowners shall be contacted directly. These inspections shall be carried out by a pre-inspection firm experienced in this line of work.
3. During the actual construction process, the CONTRACTOR shall provide the monitoring and recording of the actual vibrations generated. A baseline of ambient vibration levels shall be established prior to driving sheet piling.

a. The particle acceleration during the driving of the sheet piling shall not exceed 2.0 FPS.
b. The CONTRACTOR will be required to change the construction methods if the work is resulting in unacceptable vibration levels.

4. All municipal, county, state, and federal ordinances, codes, regulations, and laws shall be observed. The CONTRACTOR shall provide all sheeting, shoring, and bracing which conforms to New York State Department of Labor – Industrial Code Note 23 and all applicable sections of the 1970 Occupational Safety and Health Act (OSHA), and any other requirements as necessary.
5. All municipal, county, state and federal ordinances, codes, regulations, laws and OSHA regulations shall be observed.
6. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down the shoring and bracing as excavation progresses.
7. Safe and satisfactory sheeting, shoring and bracing shall be the entire responsibility of the CONTRACTOR.
8. The CONTRACTOR shall be held accountable and responsible for the sufficiency of all shoring and bracing used and for all damage to persons or property resulting from the improper quality, strength, placing, maintaining or removing of the same.
9. The ENGINEER'S permission to proceed with work in either a sheeted, shored braced or open trench condition shall in no way relieve the CONTRACTOR from the above responsibilities.
10. The clearances and types of temporary structures, insofar as they affect the character of the finished work, and the design of steel sheeting to be left in place, will be subject to the review of the ENGINEER, but the CONTRACTOR shall be solely responsible for the adequacy of all sheeting, shoring, bracing, cofferdamming, etc.
11. Unless otherwise shown, specified, or ordered, all materials used for temporary construction shall be removed when work is completed. Such removal shall be made in a manner not injurious to the pipelines or structures.
12. All steel sheet piling designed to remain in place shall be new materials. New or used materials may be used for temporary work.
13. Steel sheet piling shall be manufactured from steel conforming to ASTM A328. Steel for soldier piles, wales, and braces shall be manufactured to conform to ASTM A36.

B. Sheeting Left in Place

1. Steel sheet piling shall be left in place or where conditions are such that the removal of sheeting will endanger the work or adjacent pipes or structures or when ordered in writing to be left in place by the ENGINEER. It shall consist of rolled sections of the continuous interlocking type unless otherwise specified. The type and design of the sheeting and bracing shall conform to the above specifications for all steel work for sheeting and bracing.
2. Steel sheet piling to be left in place shall be driven straight to the lines and grades as shown or directed. The piles shall penetrate into firm materials

with secure interlocking throughout the entire length of the pile. Damaged piling having faulty alignment shall be pulled and replaced by new piling.

3. The type of guide structure used and method of driving for steel sheet piling to be left in place shall be submitted to the ENGINEER for review. Jetting will not be permitted.
4. The CONTRACTOR shall cut off piling left in place at least 2 feet below road surface or to the grades shown or ordered by the ENGINEER and shall dispose of the cutoffs.
5. Portions of sheeting or soldier piles and breast boards which are in contact with concrete shall be left in place.

C. Removal of Sheeting and Bracing

1. Sheeting and bracing shall be removed from excavation unless otherwise indicated by the ENGINEER. Removal shall be done so as to not cause injury to the work.
    a. Wood or steel sheeting shall not be removed when adjacent to structures, pavement, pipes, or any other public or private property where removal may cause damage to such property.
    b. Fill all voids left by removal of sheeting with select fill.
2. Removal of sheet piling shall be done so as not to cause injury to the Work. Removal shall be equal on both sides of excavation to ensure no unequal loads on pipe or structures.

D. Pipeline Alignment in New York State Department of Transportation and Erie County Highway Department Right-Of-Way:

1. The New York State Department Of Transportation and Erie County Highway Department require all trenches or excavations which fall within a 1 on 1 slope as measured from the edge of pavement to be tight-sheeted with pre-driven steel sheet piling prior to excavation.
    a. The design of the predriven steel sheet piling and bracing system is the responsibility of the CONTRACTOR. The ENGINEER may reject any materials which he regards as unsound.
    b. A copy of all predriven steel sheet piling and bracing system designs shall be submitted to the ENGINEER for his information before installation of same. Each drawing and computation page shall display the seal and signature of a licensed New York State professional engineer. This information must also be submitted to the Agency having jurisdiction for review and must meet with that Agency's approval.
    c. The CONTRACTOR'S submittal to the ENGINEER shall include written verification from the Agency of jurisdiction that the information being submitted to the ENGINEER has been approved by that Agency.
2. If devices other than pre-driven steel sheet piling are approved by the Agency of jurisdiction in areas designated as requiring temporary sheeting, the CONTRACTOR may (with the ENGINEER'S review) be allowed to use

them. However, the costs of furnishing and using these devices will be considered as included in the unit prices bid for the various pipe sections.

E. In areas where the Drawings call for sheeting to remain in place, alternate sheeting methods will not be allowed. Only pre-driven, steel sheet piling systems designed for the CONTRACTOR by a professional engineer will be allowed in these areas.

3.08 BACKFILL AND COMPACTION

A. All backfill required for trenches and structures required to provide the finished grades shown and as described herein shall be furnished, placed and compacted in 6 inch lifts by the CONTRACTOR. Unless otherwise specified or required, fill shall be obtained from the excavated materials. All materials used for filling and backfilling shall be soil of acceptable quality, free from boulders, frozen lumps, wood, stumps, sludge, or other organic matter or other deleterious or hazardous materials. Excavated materials meeting these requirements and approved by the ENGINEER may be used as backfill.

B. Rock and/or earth material may be encountered during the work that is unsuitable for backfilling. When this material is encountered, it shall be disposed of in the specified manner, possibly resulting in a shortage of suitable backfill material. In this event, the CONTRACTOR shall be responsible for furnishing, delivering and installing clean earth or select backfill materials to properly and completely backfill the excavation. Backfill material for these situations may be obtained from other areas of the project where suitable material is available or from offsite locations as approved by the ENGINEER. All backfill material is subject to the ENGINEER'S review and must meet the minimum requirements of the specifications above.

C. Backfill excavations as promptly as work permits, but not until completion of the following:
   1. Inspection by the ENGINEER of all work within the excavation.
   2. Inspection, testing approval, and recording of locations of underground utilities, connections, branches, structures and other facilities.
   3. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in a manner to prevent settlement of the structure or utilities, or leave in place if required.
   4. Removal and proper disposal of trash and debris.

D. Excavation shall be kept dry during backfilling operations. Backfill around piping and structures shall be brought up evenly on all sides.

E. The minimum density to be obtained during backfilling operations shall be 95 percent and is a percentage of the maximum density obtained in the laboratory as defined in ASTM D698 Method C including Note 2. This percentage is of modified Proctor density. In-place density determinations shall be made using a sand density cone or equivalent method as specified by ASTM D1556. If any bricks, bottles,

pieces of metal, debris or other foreign matter larger than $^{3}/_{4}$-inch size are encountered in the density test hole, a different test location shall be chosen. The ENGINEER will determine the frequency of field testing required to determine the density of the fill and shall direct the number and location of density tests. All equipment necessary to determine fill density, including nuclear density meters, shall be supplied by the CONTRACTOR.

F. The water content of fill material shall be controlled during placement within the range necessary to obtain the density specified. In general, the moisture content of the fill shall be within 5 percent dry and 2 percent wet of the optimum moisture content for the specified density as determined by laboratory tests. The CONTRACTOR shall perform all necessary work to adjust the water content of the material to within the range necessary to permit the density specified. No fill material shall be placed and no compaction of fill will be permitted when there is any standing water in the trenches or when the fill material or the ground the fill is to be placed on is frozen.

G. The CONTRACTOR is not allowed to access any part of an existing water supply system (fire hydrants, etc.) as a source of water for any reason during construction activities, including the use of water for backfilling to obtain the proper moisture content.

H. If the specified densities are not obtained because of the CONTRACTOR'S improper control of placement or compaction procedures, or because of inadequate or improperly functioning equipment, the CONTRACTOR shall perform whatever work is required to provide the specified densities. This work shall include complete removal of unacceptable fill areas, replacement and recompaction until acceptable fill is provided.

I. All backfill in pipe trenches shall be placed in horizontal layers not exceeding 6 inches in depth and thoroughly compacted before the next layer is placed.

J. Where pipe is laid in rock excavation, crushed stone or gravel fill shall be carefully placed and tamped over the rock before the pipe is laid. After laying, pipe, the balance of the backfill shall be placed as described herein above.

K. Placement:

1. Place pipe bedding, select backfill and/or earth backfill or borrow materials, as specified herein and in Section 15051- Buried Piping Installation.
2. Trenches under roadways shall be backfilled with select backfill material for the entire length of the open cut crossing plus 5 feet back from the edge of pavement or a distance equal to a 1 on 1 slope to the invert, whichever is greater.
3. Where shoulders are excavated, the trench shall be backfilled with select granular material.

4. The entire trench area under driveways, parking areas, and sidewalks, shall be backfilled with select granular material in accordance with the Contract Drawings and Specifications.
5. Prior to commencing with the backfilling operation, the CONTRACTOR shall submit information to the ENGINEER such as catalog cuts, specification sheets, etc., describing the type of compaction equipment he intends to use.

L. Pipe Trench Preparation
1. Braced trench width shall be minimized to greatest extent practical but shall conform to the following:
   a. Trench width shall be sufficient to provide room for installing, jointing and inspecting piping, as shown on Contract Drawings.
   b. Enlargements at pipe joints may be made if required and specified by the ENGINEER.
   c. Trench width shall be sufficient for sheeting, bracing, sloping, and dewatering.
   d. Trench width shall be sufficient to allow thorough compacting of backfill.
   e. Do not use excavating equipment which requires the trench to be excavated to excessive width.
2. Depth of trench shall be as shown. If required, depths may be revised as specified by the ENGINEER.

M. The CONTRACTOR shall repair any settlement that occurs at no additional cost to the OWNER.

3.09 GRADING

A. General
Uniformly grade areas within limits of grading under this Section including adjacent transition areas. Smooth subgrade surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.

B. Turfed Areas
Finish areas to receive topsoil to within not more than 1 inch above or below the required subgrade elevation.

C. Walks and Pavements
Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than $^1/_2$ inch above or below the required subgrade elevation.

D. Slabs
Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 3 inch when tested with a 10 foot straightedge.

E. Compaction
After grading, compact subgrade surfaces to the depth and percentage of maximum density required.

F. All existing drainage swales and ditches, if disturbed, shall immediately, upon completion of pipe installation, be restored to proper lines and grades. CONTRACTOR shall ensure the final drainage facilities are in working condition and acceptable to the agency of jurisdiction.

3.10 PAVEMENT SUBBASE COURSE

A. General
Place subbase material, in layers of specified thickness, over ground surface to support the pavement base course.

B. Grade Control
During construction, maintain lines and grades including crown and cross-slope of subbase course.

C. Shoulders
Place shoulders along edges of subbase course to prevent lateral movement. Construct shoulders of acceptable soil materials as specified, placed in such quantity to compact to thickness of each subbase course layer. Compact and roll at least 12 inch width of shoulder simultaneously with compacting and rolling of each layer of subbase course.

D. Placing
Place subbase course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting subbase material during placement operations. When a compacted subbase course is shown to be 6 inches thick or less, place material in a single layer. When shown to be more than 6 inches thick, place material in equal layers, except no single layer more than 6 inches or less than 3 inches in thickness when compacted.

3.11 DISPOSAL OF EXCAVATED MATERIALS

A. Material removed from the excavations which does not conform to the requirements for fill or is in excess of that required for backfill shall be hauled away by the CONTRACTOR and disposed of in compliance with Municipal, County, State, Federal or other applicable regulations at no additional cost to the OWNER.

B. The CONTRACTOR shall not dispose waste excavated material in any of the following locations:
1. Wetland areas.
2. Flood plains.
3. Any area where excess siltation will damage or pollute receiving water.

4. Disposal of excess materials shall only be allowed at locations approved by NYSDEC Region 9.

3.12 RESTORATION AND CLEAN-UP

A. Following installation, the CONTRACTOR shall restore all areas to their original condition to the requirements of Section 02900 - Restoration, and to the satisfaction of the ENGINEER.

END OF SECTION

SECTION 02900

RESTORATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

The work specified shall include all labor, material, equipment, services and incidentals necessary to restore surfaces, pavements, sidewalks, driveways, curbs, gutters, lawns, culverts, and other features disturbed, damaged, or destroyed during the performance of the work under or as a result of the operations of the Contract.

B. Related Work Specified Elsewhere

1. Section 02316 - Select Granular Materials
2. Section 02317 - Rock Excavation
3. Section 02351 - Excavation, Backfill, and Trenching
4. Section 03300 - Concrete
5. Section 15051 - Buried Piping Installation

1.02 QUALITY ASSURANCE

A. The quality of materials and the performance of work used in the restoration shall produce a surface or feature equal to the condition of each before the work began.

B. Reference Standards

1. American Association of Nurserymen (AAN)
2. ASTM D698, Standard Compaction Test
3. ASTM D2487, Classification of Soils for Engineering
4. ASTM D2974, Standard Test Method for Moisture, Ash and Organic Matter of Peat and Other Organic Soils
5. New York State Department of Transportation Standard Specifications, latest revision

1.03 SUBMITTALS

A. CONTRACTOR shall submit the following submittals:

1. The location of source and data for off-site topsoil.
2. Analysis of the seed.
3. Should a hydroseeder be used, the CONTRACTOR shall submit all data including material and application rates.
4. Mix designs for asphalt.

1.04 SCHEDULE OF RESTORATION

A. A schedule of restoration operations shall be submitted by the CONTRACTOR for review.
   1. After an accepted schedule has been agreed upon it shall be adhered to unless otherwise revised by the ENGINEER.

B. In general, permanent restoration of traveled surfaces will not be permitted until one month time has elapsed after excavations have been completely backfilled as specified.

C. The replacement of surfaces at any time, as scheduled or as directed, shall not relieve the CONTRACTOR of responsibility to repair damages by settlement or other failures.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Topsoil shall be unfrozen friable clayey loam free from clay lumps, stones, roots, sticks, stumps, brush, hazardous materials, or foreign objects.

B. Fertilizer shall be a standard quality commercial carrier of available plant food elements. A complete prepared and packaged material containing a minimum of 10 percent nitrogen, 10 percent phosphoric acid and 10 percent potash.
   1. Each bag of fertilizer shall bear the manufacturer's name and guaranteed statement of analysis.

C. Seed mixtures shall be of commercial stock of the current season's crop and shall be delivered in unopened containers bearing the guaranteed analysis of the mix.
   1. All seed shall meet the New York State Department of Transportation 713-04 standard specifications for germination and purity.

D. Seed Mixtures:

Specia	Lawn Areas*	Non-maintained Areas*
Kentucky Bluegrass	50	20
Creeping Red Fescue	30	20
Manhattan or Pennfine Ryegrass	20	60

* % by weight

E. Mulch shall be stalks of oats, wheat, rye or other acceptable crops which are free from noxious weeds.

2.02 MATERIALS

A. Paving Materials: The source and gradation of materials shall be acceptable to the ENGINEER. Materials shall be as defined on contract drawings, and if not defined on contract drawings shall conform to the following:

1. Pavement Sub-Base Course Material: The sub-base course materials shall be select backfill material as specified in Section 02316 of the Specifications.
2. Tack Coat: The tack coat shall be NYSDOT Section 702, Item 702-3401 Asphalt Emulsion (HFMS-2H).
3. Bituminous Base Course: Base course where required shall be placed in accordance with the NYSDOT Specifications, Section 402 – Hot Mix Asphalt Concrete Pavement. The material shall be NYSDOT, Item 402.378903, 37.5 F9 Base Course HMA, 80 Series Compaction.
4. Bituminous Binder Course: Binder course pavement where required shall be placed in accordance with NYSDOT Specifications, Section 402 – Hot Mix Asphalt Concrete Pavement. The binder course pavement material shall be NYSDOT Item No. 402.198903 19 F9 Binder Course HMA, 80 Series Compaction.
5. Bituminous Surface Course: The bituminous concrete surface course shall be a hot mix bituminous material consisting of a mixture of mineral aggregate and asphalt cement as approved by ENGINEER. The surface course shall be NYSDOT Item No. 402.098203 9.5 F2 Top Course HMA, 80 Series Compaction.

B. Concrete Materials: Concrete used for road bases, roads, driveways, sidewalks, curbs, or similar items shall be a 4,000 psi mix. Concrete and reinforcing materials shall be as specified in Section 03300 of these Specifications.

2.03 MATERIALS TESTING.

A. All materials must be tested and approved prior to delivery to the site. Samples of materials proposed for use shall be submitted by the CONTRACTOR to the ENGINEER and the testing laboratory. Samples of the materials shall be submitted at least ten days in advance of its anticipated use.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Temporary Pavement

1. Immediately upon completion of backfilling of the trench or excavation, the CONTRACTOR shall place a temporary pavement over all disturbed areas of streets, driveways, sidewalks, and other traveled places where the original surface has been disturbed as a result of his operations.

2. The temporary pavement shall consist of compacted select backfill surfaced with cold patch to such a depth as required to withstand the traffic to which it will be subjected.
3. The surface of the temporary pavement shall conform to the slope and grade of the area being restored.
4. For dust prevention, the CONTRACTOR shall treat all surfaces, not covered with cold patch, as frequently as may be required
5. The temporary pavement shall be maintained by the CONTRACTOR in a safe and satisfactory condition until such time as the permanent paving is completed. The CONTRACTOR shall immediately remove and restore all pavement as shall become unsatisfactory.

B. Permanent Pavement Replacement

1. The permanent and final re-paving of all streets, driveways and similar surfaces where pavement has been removed, disturbed, settled or damaged by or as a result of performance of the Contract shall be repaired and replaced by the CONTRACTOR, by a new and similar pavement, consisting of base, binder, and/or top courses each having the same depth as existing pavement or as required by the local community or Highway Permit.
    a. The top surface shall conform with the grade of existing adjacent pavement and the entire replacement shall meet the current specifications of the local community for the particular types of pavement.
    b. Where the local community has no specification for the type of pavement, the work shall be done in conformity with the New York State Department of Transportation Standard which conforms the closest to the type of surfacing being replaced, as determined by the ENGINEER and with the following specifications:
        1) Unless specified otherwise, replacement of existing roads under the jurisdiction of New York State, Counties or Cities, shall be constructed to the following requirements:
            a) Pavement subbase as outlined under Section 02316.
            b) Base Course Pavement – 8 inches minimum compacted thickness or combination of concrete base where encountered.
            c) Binder Course Pavement – 1-$^1/_2$ inches minimum compacted thickness.
            d) Surface Course Pavement – 1 inch minimum compacted thickness.
        2) Unless specified otherwise, replacement of existing roads under the jurisdiction of Towns or Villages shall be constructed to the following requirements:
            a) Pavement subbase as outlined under Section 02316.

b) Binder Course Pavement – 4 inches minimum compacted thickness.

c) Surface Course Pavement – 2 inches minimum compacted thickness.

c. All required permits for local governing bodies shall be obtained.

d. Install or reinstall pavement striping in accordance with NYSDOT Standard Specifications.

C. Preparation for Permanent Pavement

1. When scheduled and within the time specified, the temporary pavement shall be removed and base prepared, at the depth required by the local community or Highway Permit, to receive the permanent pavement.
   a. The base shall be brought to the required grade and cross-section and thoroughly compacted before placing the permanent pavement.
   b. Any base material which has become unstable for any reason shall be removed and replaced with compacted base materials.
   c. Cuts which are not straight will require another saw-cutting further from the trench. Additional select backfill and pavement needed for restoration outside the defined pay limits will be installed and paid for by the CONTRACTOR.
2. Prior to placing the permanent pavement, all service boxes, manhole frames and covers and similar structures within the area shall be adjusted to the established grade and cross-section.
3. The edges of existing asphalt pavement shall be cut a minimum of one foot beyond the excavation or disturbed base whichever is greater.
   a. All cuts shall be parallel or perpendicular to the centerline of the street.
   b. All cuts will be made in straight continuous lines by saw-cutting or other acceptable technique.
   c. Additional one-foot saw cut may be required for top course if shown on the drawings or required by permit.
4. Install or reinstall traffic inductance loops in accordance with NYSDOT Standard Specifications by a firm which is qualified by the NYSDOT.

D. Bituminous Tack Coat

1. The tack coat shall be uniformly applied by a pressure distributor to a prepared clean pavement. The tack coat shall be applied as approved by the ENGINEER to offer the least inconvenience to traffic and to permit one-way traffic, where practical, to prevent pickup or tracking of the bituminous material.
2. Tack coat shall not be applied on a wet pavement surface or when the surface temperature is below 45 degrees F. The temperature and areas to be treated shall be approved by the ENGINEER prior to application. The application rate shall be 0.03 to 0.07 gallons per square yard as approved by the ENGINEER.

E. Asphalt Pavement

1. The permanent asphalt pavement replacement for streets, driveways and parking area surfaces shall be replaced with bituminous materials of the same depth and kind as the existing unless otherwise specified.
2. Prior to placing of any bituminous pavement tack coat shall be applied to the edges of the existing pavement and other features.
3. The furnishing, handling and compaction of all bituminous materials shall be in accordance with the New York State Department of Transportation Standards latest edition.

F. Cold Milling

1. Cold milling of existing surfaces shall follow New York State Department of Transportation Standard Specifications, latest edition.
2. Material removed during the milling process will become the property of the CONTRACTOR and shall be disposed of at an acceptable location off-site.
3. CONTRACTOR must maintain drainage into all gutters and catch basins during the milling operation.

G. Concrete Pavement and Pavement Base

1. Concrete pavements and concrete bases for asphalt, brick or other pavement surfaces shall be replaced with Class "A" concrete, air-entrained as specified in Section 03300.
2. Paving slabs or concrete bases shall be constructed to extend one foot beyond each side of the trench and be supported on undisturbed soil. Where such extension of the pavement will leave less than two feet of original pavement slab or base, the repair of the pavement slab or base shall be extended to replace the slab to the original edge of the pavement or base unless otherwise indicated on the Contract Drawings.
3. Where the edge of the pavement slab or concrete base slab falls within the excavation, the excavation shall be backfilled with Select Backfill compacted to 95 percent maximum dry density as determined by ASTM D698 up to the base of the concrete.
4. The new concrete shall be of the same thickness as the slab being replace and shall contain reinforcement equal to the old pavement.
    a. New concrete shall be placed and cured in accordance with the applicable provisions of the State Department of Transportation Standards.

H. Stone or Gravel Pavement

1. All pavement and other areas surfaced with stone or gravel shall be replaced with material to match the existing surface unless otherwise specified.
    a. The depth of the stone or gravel shall be at least equal to the existing or at least 6 inches.

b. After compaction, the surface shall conform to the slope and grade of the area being replaced.

c. Stone material used shall comply with the New York State Department of Transportation Standard Specifications, latest edition.

I. Driveways

1. Asphalt Driveways

a. After the watermain has been installed and the trench properly backfilled, the CONTRACTOR shall cut back the drive one foot each side of the trench. The asphalt shall be cut with carborundum saw or other device to give a uniform and continuous straight edge. Where watermains or service piping are installed under drive aprons the ENGINEER may specify the replacement of the entire apron and the CONTRACTOR shall remove and replace same to its base.

b. The cut edge shall be painted with a bituminous seal coat and asphalt shall then be replaced to equal or exceed the existing asphalt in quality and depth.

1) In no case shall the finished thickness of the asphalt driveway be less than four (4) inches, a minimum of three (3) inches of binder and one (1) inch of top to match the existing driveway.

2) Courses shall be laid in one (1) inch lifts and compacted with a minimum two (2) ton roller or other mechanical means specified by the ENGINEER.

3) If the existing drive was in the opinion of the ENGINEER recently sealed, then the CONTRACTOR shall apply one (1) coat of coal tar emulsion sealer over the top lift. In no case shall cold patch be considered pavement, but may be used temporarily as an expedient, the cost of which will be borne by the CONTRACTOR.

2. Concrete Driveways

a. The CONTRACTOR shall be responsible for the proper consolidation of the sub-grade before laying the new driveway, and any settlement or failure of the new driveway shall be repaired or replaced by the CONTRACTOR to the satisfaction of the ENGINEER.

b. Where drives are encountered, the CONTRACTOR shall cut the concrete each side of the trench limits using a concrete saw at breaks in the drive or at expansion joints at the direction of the ENGINEER. Any concrete broken beyond the cut or break line will be replaced at the CONTRACTOR'S expense.

c. The drive shall then be replaced to equal or exceed the existing drive in quality and depth.

1) Reinforcing shall be installed in all replacements, tieing it to existing reinforcing where it protrudes from the cut edge. 6 x 6 x 6 welded wire mesh or equal shall be used. The CONTRACTOR shall then install Transit Mix Concrete meeting NYSDOT specifications to the depth of the original base, or a minimum of six (6") inches, whichever is more.

2) The surface shall be finished to match the existing surface. The CONTRACTOR shall properly cure all concrete after placing and shall protect it from damage from all types of traffic and harm prior to final setting.

J. Concrete Walks, Curbs and Gutter Replacement

1. Concrete walks, curbs and gutters removed or damaged in connection with or as a result of the construction operations shall be replaced with new construction.
   a. The minimum replacement will be a flag or block of sidewalk and five feet of curb or gutter.
2. Walks shall be constructed of concrete, air-entrained with NYSDOT No.1 stone aggregate on a 4-inch base of compacted gravel or stone.
   a. The walk shall be not less than 4 inches in thickness or to match the thickness of the replaced walk, shall have construction joints spaced to match the existing walks, and shall have expansion joints spaced not more than 50 feet apart and shall be sloped at right angles to the longitudinal centerline approximately $^1/_8$-inch per foot of width.
3. One-half inch expansion joint material shall be placed around all objects within the sidewalk area as well as objects to which the new concrete will abut, such as valve boxes, manhole frames, curbs, buildings and others.
4. Walks shall be hand-floated and broom-finished, edged and grooved at construction joints and at intermediate intervals matching those intervals of the walk being replaced.
   a. The intermediate grooves shall be scored a minimum of $^1/_4$ of the depth of the walk.
   b. The lengths of blocks formed by the grooving tool, and distances between construction and expansion joints shall be uniform throughout the length of the walk in any one location.
5. The minimum length of curb or gutter to be left in place or replaced shall be 5 feet. Where a full section is not being replaced, the existing curb or gutter shall be saw cut to provide a true edge.
   a. The restored curb or gutter shall be the same shape, thickness and finish as being replaced and shall be built of the same concrete and

have construction and expansion joints as stated above for sidewalks.

6. All concrete shall be placed and cured as specified in Section 03300, Concrete.

K. Lawns and Improved Areas

1. The area to receive topsoil shall be graded to a depth of not less than 4 inches or as specified, below the proposed finished surface. If the depth of existing topsoil prior to construction was greater than 4 inches, topsoil shall be replaced to that depth.
   a. All debris and inorganic material shall be removed and the surface loosened for a depth of 2 inches prior to the placing of the topsoil.
   b. The topsoil shall not be placed until the subgrade is in suitable condition and shall be free of excessive moisture and frost.
   c. Topsoil placed in areas of earth excavation will not be placed until suitable earth compaction has been performed.
2. Satisfactory topsoil removed from the excavations shall be placed on the prepared subgrade to the depth required.
   a. In the event the topsoil removed during excavation is unsatisfactory or inadequate to obtain the required finish grades, the CONTRACTOR shall furnish the required quantity of satisfactory topsoil from specified sources off site.
   b. All topsoil shall be free from stones, roots, sticks and other foreign substances and shall not be placed in a frozen or muddy condition.
   c. The finished surface shall conform to the lines and grades of the area before disturbed or as shown on the Contract Drawings. Any irregularities shall be corrected before the placement of fertilizer and seed.
3. The fertilizer shall be applied uniformly at the rate of 20 pounds per 1000 square feet.
   a. Following the application of the fertilizer and prior to application of the seed, the topsoil shall be scarified to a depth of at least 2 inches with a disc or other suitable method traveling across the slope if possible.
4. When the topsoil surface has been fine graded, the seed mixture shall be uniformly applied upon the prepared surface with a mechanical spreader at a rate of not less than 5 pounds per 1000 square feet.
   a. The seed shall be raked lightly into the surface and rolled with a light hand lawn roller.
   b. Seeding and mulching shall not be done during windy weather.
5. The mulch shall be hand or machine spread to form a continuous blanket over the seed bed, approximately 2 inches uniform thickness at loose measurement. Excessive amounts or bunching of mulch will not be permitted.
   a. Mulch shall be anchored by an acceptable method.

b. Unless otherwise specified, mulch shall be left in place and allowed to disintegrate.

c. Any anchorage or mulch that has not disintegrated at time of first mowing, shall be removed. Anchors may be removed or driven flush with ground surface.

6. Seeded areas shall be watered as often as required to obtain germination and to obtain and maintain a satisfactory sod growth. Watering shall be in such a manner as to prevent washing out of seed. Any washout or damage which occurs shall be regraded and reseeded until a good sod is established.

7. Hydroseeding may be accepted as an alternative method of applying fertilizer, seed and mulch. The CONTRACTOR must submit all data regarding materials and application rates to the ENGINEER for review.

8. The CONTRACTOR shall maintain the newly seeded areas, including regrading, reseeding, watering and mowing, in good condition, until the development of an established cover.

L. Cultivated Area Replacement

1. Areas of cultivated lands shall be graded to a depth to receive topsoil of not less than the depth of the topsoil before being disturbed. All debris and inorganic material shall be removed prior to placing of the topsoil.

2. After the topsoil has been placed and graded, the entire area disturbed during construction shall be cultivated to a minimum depth of 12 inches with normal farm equipment.

a. Any debris or inorganic materials appearing shall be removed.

b. The removal of stones shall be governed by the adjacent undisturbed cultivated area.

3. Grass areas shall be re-seeded using a mixture equal to that of the area before being disturbed, unless otherwise specified.

M. Other Types of Restoration

1. Shrubs and landscape items damaged or destroyed as a result of the construction operations shall be replaced in like species and size.

a. All planting and care thereof shall meet the standards of the American Association of Nurserymen.

2. Water courses shall be reshaped to the original grade and cross-section and all debris removed. Where required to prevent erosion, the bottom and sides of the water course shall be protected.

3. Culverts destroyed or removed as a result of the construction operations shall be replaced in like size and material and shall be replaced at the original location and grade. When there is minor damage to a culvert and with the consent of the ENGINEER, a repair may be undertaken, if satisfactory results can be obtained.

4. Should brick pavements be encountered in the work, the restoration shall be as set forth in the General Requirements or as directed.

5. Items removed for construction such as mailboxes, signposts, reflector markers, and the like shall be replaced in as good or better condition than existing. Items damaged by the CONTRACTOR shall be replaced at his expense. Privately owned items, such as mailboxes, shall be reinstalled to the satisfaction of the OWNER and ENGINEER.

N. Lawn Maintenance

1. All lawn areas shall be mowed by the CONTRACTOR before the new grass reaches a height of 4 inches.
   a. Following the establishment of a good stand of grass and the first mowing, the CONTRACTOR'S obligation shall end except for the repair of settlement or damage
2. Any lawn area which does not develop an established cover shall be re-seeded and maintained at the CONTRACTOR'S expense until an established cover is present.

O. Tree Plantings

1. Determine location of underground utilities and perform work in a manner which will avoid possible damage. Hand excavate, as required, to minimize possibility of damage to underground utilities. Maintain grade stakes until removal is mutually agreed upon by all parties concerned.
2. Trees replaced by the CONTRACTOR will be of the same species, and will be a minimum of 6 feet high and 2 inches in trunk diameter. CONTRACTOR must fertilize and water tree appropriately after planting and will guarantee tree for a period of one year. All issues regarding tree planting including type, size, and final location must be approved by the ENGINEER prior to payment.

END OF SECTION

SECTION 03300

CONCRETE

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified
1. All cast-in-place concrete used in the construction of watermains and appurtenances including cradles, encasements, thrust blocks, anchors, and manholes.
2. All cast-in-place concrete used in the construction of sidewalks, gutters, curbs and other sections of restoration.
3. Reinforcing steel, form work, and items of concrete accessories required for the completion of the work.

B. Related Work Specified Elsewhere
1. Section 01450 - Testing Laboratory Services Furnished by Contractor
2. Section 02351 - Excavation, Backfill and Trenching
3. Section 02900 - Restoration

1.02 QUALITY ASSURANCE

A. References
1. ACI 211, Proportioning Concrete Mixtures
2. ACI 304, Measuring, Mixing, Transporting, and Placing Concrete
3. ACI 305R, Hot Weather Concreting
4. ACI 306, Cold Weather Concreting
5. ACI 309R, Consolidation of Concrete
6. ASTM A185, Standard Specifications for Steel Welded Wire Fabric, Plain for Concrete Reinforcement
7. ASTM A615, Standard Specifications for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
8. ASTM C33, Standard Specifications for Concrete Aggregates
9. ASTM C94, Standard Specifications for Ready-Mixed Concrete
10. ASTM C150, Standard Specifications for Portland Cement
11. ASTM C260, Standard Specifications for Air-Entraining Admixtures for Concrete
12. ASTM C309, Standard Specifications for Liquid Membrane-Forming Compounds for Curing Concrete
13. ASTM C494, Standard Specifications for Chemical Admixtures for Concrete
14. ASTM D1751, Standard Specifications for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction

B. Tests
   1. All previous testing of non-concrete materials incorporated in the concrete mix shall be performed within the past twelve months. Make test reports available to the ENGINEER upon request.
   2. For each day when concrete is being placed, provide one slump test and three cylinders for compression testing. One cylinder shall be tested at 7 days and two (2) cylinders at 28 days. Submit all copies of test results to ENGINEER for review.

1.03. SUBMITTALS

A. Name and location of concrete supplier.

B. Concrete mix design indicating amount of all ingredients for concrete to be used in the Work.

C. Manufacturer's literature for curing compounds, joint materials, admixtures, form coatings, manufactured form systems, ties, etc.

D. Laboratory test results; compression cylinder test results from previous projects may be used for verification of design.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Cement
   1. Conform to ASTM C150, Type II.
   2. Type I or III may be employed with the ENGINEER'S approval.

B. Fine and Coarse Aggregates
   1. Comply in all respects to ASTM C33.
   2. Maximum size of coarse aggregate: 1 – 2 inches; ¾-inch for precast structures.
   3. Coarse aggregate for concrete used for sidewalks, curbs, and gutters shall be crushed limestone or approved equal.

C. Water: Potable and complying with ASTM C94

D. Admixtures
   1. Water Reducing - conform to ASTM C494, Type A.
   2. Air-Entraining - conform to ASTM C260.

E. Reinforcing steel bars shall be deformed new billet steel conforming to ASTM A615, Grade 60. Welded wire fabric shall be cold drawn steel conforming to ASTM A185.

F. Expansion joint material shall be ASTM D1751, asphalt-saturated cellulosic fiber, $^1/_2$ inch thickness and of the width required for full depth joints.

G. Membrane curing compound shall be pigmented and conform to the requirements of ASTM C309, Type 1, Class B.

H. Grout - All grout shall be non-shrink, non-metallic, non-gas forming, preblended and ready for use requiring only the addition of water. Minimum 28 day compressive strength must be 5000 psi.

2.02 CONCRETE MIX DESIGN

A. Mix design shall be established by the concrete supplier based on a proven strength record for concrete made with similar ingredients.

B. Conform to ACI 211, except as specified herein, using approved materials.

C. The various classes of concrete are designated as follows:

Class	Design Compressive Strength at 28 Day, psi	Maximum Water/Cement Ratio by Weights	Minimum Weight of Cement Per Cubic Yard
A (air-entrained)	4000	0.45	600 lbs

D. Maximum Slump
1. General - 4 inches
2. Sidewalks, curbs and gutters - 3 inches
3. Use minimum water possible subject to workability.

E. Except where otherwise specified, all concrete shall be air-entrained in the range of 5% to 7%.

2.03 BATCHING AND MIXING

A. Batching
1. The CONTRACTOR shall have a modern and dependable batch plant within a reasonable distance from the work at his disposal.
2. Comply with ACI 304.
3. Use only approved materials.

B. Mixing and Delivery
1. Comply with ASTM C94, and furnish batch ticket information.

2.04 SOLID CONCRETE BLOCKS

A. Solid concrete blocks used for support or restraint shall be of nominal sizes conforming to ASTM C55.

B. Units shall have a minimum compressive strength of 3500 psi.

PART 3 - EXECUTION

3.01 CONCRETE PLACEMENT

A. Forms shall be substantially free from surface defects and sufficiently tight to prevent leakage of mortar. They shall be properly braced and tied so as to maintain position and shape during and after placing of concrete.

B. The CONTRACTOR shall build into the concrete reinforcing steel, sleeves, waterstops, etc., as shown on the Contract Drawings, or in restoration work, reinforcing steel and other embedded items equal to that found in the concrete being replaced.

C. All concrete shall be thoroughly consolidated by the use of vibrators or by spading or puddling sticks and tampers in accordance with ACI 309R.

1. No concrete shall be deposited under water without written permission of the ENGINEER and then only in accordance with proper tremie techniques.

D. Cold weather placement: Comply with ACI 306.1.

E. Hot weather placement: Comply with ACI 305R.

F. At locations where replacing section of existing concrete driveway or walkway, sawcut existing concrete to provide a clean edge at the nearest adjacent construction joint, provided that the joint is beyond one foot from the edge of the trench or excavation.

3.02 FINISHING

A. All formed concrete surfaces to be exposed shall be given a rubbed finish. In the case of restoration, the rubbed finish shall be equal to that of the concrete surface being replaced.

B. Inverts, benchwalls, floors or structures and similar surfaces shall be given a float finish.

C. Sidewalks and driveways shall be hand floated using a magnesium float and given a broom finish perpendicular to traffic, edges of slabs to be tooled.

3.03 CURING

A. Concrete shall be maintained in a moist condition for seven (7) days using methods that will insure complete and continuous saturation.

B. Sidewalks, curbs and gutters may be cured by the use of a membrane curing compound applied in accordance with the manufacturer's directions.

3.04 NON-SHRINK GROUTING

A. For openings that are left in new concrete or where made in existing concrete for the insertion of wall castings, pipes or other fixtures, the space around these items shall be made watertight by completely filling with a non-shrink grout unless another means is specified elsewhere in the Contract Documents.

B. All work shall be done in strict accordance with the manufacturer's recommendations.

3.05 QUALITY CONTROL

A. The CONTRACTOR shall be solely responsible for the quality control of all concrete.

B. Concrete which does not meet the requirements of these specifications may be rejected by the ENGINEER.

C. Field Inspection: Testing shall be performed in accordance with Section 01450, Testing Laboratory Services Furnished by Contractor.

END OF SECTION

SECTION 15051

BURIED PIPING INSTALLATION

PART 1 – GENERAL

1.01 DESCRIPTION

A. Work Specified

The work specified shall include all labor, material, equipment, services and incidentals necessary to furnish and install watermain, specials and fittings, install fire hydrants and to perform interconnections and abandonments as shown on the plans and specified herein.

B. Related Work Specified Elsewhere

1. Section 02080 - Fire Hydrants
2. Section 02316 - Select Granular Materials
3. Section 02351 - Excavation, Backfill, and Trenching
4. Section 15103 - High Density Polyethylene (HDPE) Pipe and Fittings
5. Section 15106 - Ductile Iron Pipe and Fittings
6. Section 15107 - Copper Pipe
7. Section 15108 - Thermoplastic Pipe
8. Section 15109 - Prestressed Concrete Cylinder Pipe
9. Section 15110 - Valves and Appurtenances
10. Section 15120 - Piping Specialties and Accessories
11. Section 15140 - Testing and Disinfection

1.02 QUALITY ASSURANCE

A. Reference Standards

1. AWWA Standards identified in other related sections
2. ASTM Standards identified in other related sections
3. ANSI Standards identified in other related sections
4. Occupational Safety and Health Administration (OSHA)
5. 1996 Safe Drinking Water Act
6. NSF/ANSI Standard 60 and 61, as applicable
7. All other standards itemized in related work sections

1.03 SUBMITTALS

A. Shop Drawings

Prior to obtaining any products in relationship to this Section, the CONTRACTOR shall submit detailed shop drawings and data for review by the ENGINEER.

B. Materials List

The CONTRACTOR shall submit, along with shop drawings, a materials list, which shall include full information regarding all components of the watermain. Materials of construction shall be presented in the listing.

C. Other Submittals

1. Prior to installation of the proposed watermain, the CONTRACTOR shall furnish the required number of the manufacturer's Operation and Maintenance Manual for each item.
2. The CONTRACTOR shall submit certificates of compliance with the applicable referenced standards.
3. A tabulated layout schedule.
4. Detailed procedure, schedules and list of materials for interconnection sequence.
5. Furnish delivery tickets indicating the pipe manufacturer, pipe type and class, identifying that the pipe was new and from a manufacturer that has been submitted and approved.

D. Certificate

1. Submit certificate of compliance with NSF/ANSI Standard 61 for all products under this section, including interior coatings, by an independent, authorized laboratory.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. During delivery and handling, all materials shall be braced and protected from any distortion or damage in accordance with the manufacturer's requirements; any such distortion or damage shall be basis for rejection of the materials.

B. Equipment used for unloading shall be covered with wood or rubber to avoid damage to the exterior of the pipe, fittings and accessories. Do not drop or roll materials off trucks.

C. The materials shall be inspected before and after unloading. Materials that are found to be cracked, chipped, gouged, dented, or otherwise damaged shall not be accepted.

D. Interiors of pipe, fittings and specials shall be kept free from dirt and foreign matter.

E. Store pipe and fittings on heavy wood blocking or platforms so they are not in contact with the ground.

F. Pipe, fittings, and specials shall be unloaded opposite to or as close to the place where they are to be used as is practical to avoid unnecessary handling.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General

1. All products, including interior coatings, shall be suitable for use in a potable water system.
2. All products, including wetted parts, shall be certified to meet NSF/ANSI Standard 61.

B. Pipe

Materials for the piping, joints and fittings shall be as specified in other related sections or as shown in the pipe schedule or on the Contract Drawings.

1. Pipe and appurtenances shall comply with the applicable standards for its type of material.
2. All pipes, fittings, valves, hydrants, specials, and accessories must be new materials in first-class condition. Used or recycled materials shall not be allowed, regardless of condition.
3. Piping for hydrant branches shall only be Class 53 ductile iron.
4. Piping within casing pipes (except for tree bores) and beneath pavement shall be either ductile iron pipe or prestressed concrete cylinder pipe as shown and as specified.
5. Piping in non-paved areas shall be either ductile iron pipe, prestressed concrete cylinder pipe, or PVC as shown and as specified.

C. Joints

Type of joints shall be as specified in other related Sections or as shown in the pipe schedule or as on the Contract Drawings.

D. Detectable Pipe Marking Tape

Detectable pipe marking tape as manufactured by C. H. Hanson Products or approved equal shall be installed above all new watermain.

1. Tape shall be 3 inches wide consisting of two (2) exterior plies of polyethylene with an aluminum alloy foil core.
2. Tape shall be blue color and labeled: “WATER” in black letters.
3. Tape shall have a minimum thickness of 5 mils as per ASTM D2103.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General

1. Excavation and backfilling shall be in accordance with the applicable provisions of Section 02351 - Excavation, Backfill, and Trenching.
2. Blocking will not be permitted under pipe, except where the pipe is to be laid with concrete cradle or encasement.

3. Pipe shall be installed on a layer of select material as shown on the Drawings to provide an acceptable bedding. The top of this layer shall then be considered the bottom of the trench.
4. Pipe shall not be laid on bedrock without appropriate bedding stone.
5. No pipe shall be laid upon a foundation in which frost exists; or when there is danger of the formation of ice or the penetration of frost at the bottom of the excavation.
6. Bell holes shall be dug in the bottom of the trench to allow the pipe to have a firm bedding along the entire length of the pipe.
7. Temporary watertight bulkheads shall be placed in all open ends of pipe whenever pipe laying is not actively in process. The bulkheads shall be designed to prevent the entrance of dirt, debris, or water.
8. Precautions shall be taken to prevent the flotation of pipe in the event of water entering the trench.
9. Hydrant installation shall be as specified in Section 02080 - Fire Hydrants and as specified herein.

B. Location and Grade
1. Watermain and appurtenances shall be located as shown on the Contract Drawings or as directed and as established from the control survey in accordance with the General Requirements.
2. The alignment and grades shall be determined and maintained by a method acceptable to the ENGINEER.
3. Pipe shall be installed in straight horizontal trenches. "Snaking" of pipe by bending sections horizontally shall not be allowed.

C. Subgrade

The subgrade for pipelines shall be earth or bedding as specified or directed and shall be installed in accordance with Section 02351 - Excavation, Backfill and Trenching.

D. Joints
1. Joints shall be assembled using gaskets, lubricants and solvents as furnished by the pipe manufacturer and in accordance with the manufacturer's recommendations.
2. Joint deflection shall not exceed 50% of manufacturer's recommendations.

E. Bedding

Bedding shall be deposited and compacted in accordance with Section 02351 - Excavation, Backfill, and Trenching, and shall be as itemized below unless otherwise specified or directed.
1. For watermains:
   a. The bedding shall be as specified in Section 02316, Select Granular Materials.
   b. Bedding shall be deposited and tamped in 6-inch layers to the centerline of the pipe or to 6 inches above the pipe in paved or traveled areas.

c. Native material placed above the centerline of the pipe shall be deposited in such a manner as to not damage the pipe. Native material shall be suitable for backfill above the centerline of the pipe provided the materials are 2 inches in size or less. Native materials shall be suitable for backfill 6 inches above the pipe in non-paved areas provided the materials are 2 to 4 inches in size, but bedding is required to 6 inches above the pipe. Native materials greater than 4 inches are unacceptable for backfill.

F. Thrust Restraints

Thrust restraints for watermains shall be accomplished by the use of both thrust blocks and mechanical restraints for sizes through 12 inches. Joints for watermains 16 inches and larger shall have thrust restraints provided by harnessed joints only. Restraints shall be in the form of retainer glands; ductile iron locking segments with spigot weldment; or anchors of the size and type specified or as required by the pressure and stability of the supporting surface.

1. Thrust restraints shall be installed at all changes in direction, changes in size, dead ends or other locations where shown or directed.
2. Valves shall be treated as a bulkhead condition and pipe joints shall be restrained on both sides of the valve.
3. Cast in place concrete used for thrust restraints shall have developed the required strength prior to testing of the watermain.
4. When approved for use by ENGINEER, tie rods and nuts for thrust restraints shall be of high tensile steel and shall have a minimum yield strength of 70,000 psi.
   a. Tie rods and nuts installed underground shall be coated with two coats of coal tar pitch preservative coating after installation.
   b. Oil, grease, paint, or any coating which requires drying will not be acceptable.
5. All fire hydrant branches from the mainline tee to and including valve and hydrant shall be restrained.
6. All piping installed for interconnections shall be restrained.
7. All piping installed within casing pipes shall be restrained for the full length of the pipe installed within the casing pipe.
8. All piping installed within the limits of creek crossings shall be restrained for the full length of the creek crossing limits.

G. Service Connections

1. Connections to in-service pressure watermains shall be in accordance with the applicable provisions of Section 15120, Piping Specialties and Accessories.

H. Concrete Thrust Blocks

1. Solid concrete blocks shall be used for proper blocking. Hollow concrete blocks or wooden blocking are not acceptable. Cast-in-place wet concrete mix shall be used for vertical bends and anchor collars.

I. Detectable Pipe Marker

1. Detectable pipe marker tape shall be placed above all new watermains as shown on the Drawings.
2. Detectable pipe marker tape shall be tied to watermain valve boxes.
3. Splices, where needed, shall be made in accordance with manufacturer's recommendations.
4. At completion of the project and before final payment is made, the CONTRACTOR shall test the entire length of the pipe using pipe locating equipment. Tests shall be made only in the present of the ENGINEER. Any section of tape not continuous or that is undetectable shall be removed and replaced at the CONTRACTOR'S expense.

3.02 CUTTING AND SPECIAL HANDLING

A. Field cuts of pipes shall be in accordance with the manufacturer's instructions.

B. Where a pipe requires special handling or installation it shall be in accordance with the applicable referenced standard.

3.03 INTERCONNECTIONS

A. Perform interconnections as shown on the Contract Drawings and in accordance with Section 01731, Connections to Existing Facilities.

3.04 ABANDONMENTS

A. Hydrants and Valves

1. Removal of existing and abandoned hydrants and valves shall be made with caution to prevent damage while being removed.
2. Return all existing and abandoned hydrants as specified or when directed to the Erie County Water Authority at 3030 Union Road, Cheektowaga, New York.
3. CONTRACTOR is responsible for unloading the abandoned hydrants at the Erie County Water Authority and placing the hydrants in the location specified by the AUTHORITY.
4. CONTRACTOR must deliver the hydrants during normal business hours and must schedule the delivery at least 48 hours in advance.
5. At all valves being abandoned, locate the valve, close the valve, remove the entire valve box, backfill and restore as shown on the Drawings.

B. Existing Watermains

1. No watermain abandonments shall be performed until the ENGINEER is satisfied that the new watermain is functional and meets all codes, standards, tests, and requirements.
2. Abandonments shall only be allowed after all service connections have been transferred to the new watermain, when applicable.
3. Perform the abandonments as shown on Contract Drawings and in accordance with Section 01731, Connections to Existing Facilities.

3.05 TREE TUNNELING

A. Provide root protection at trees by boring casing pipe through root system.
   1. Use casing pipe as defined in Section 15121, Casing Pipe.
   2. All pipe installed in casing pipe must be restrained.
   3. PVC pipe may be installed in casing pipe if authorized by ENGINEER.
   4. Fill annular space with pea gravel to satisfaction of ENGINEER.
   5. The volume of pea gravel used shall be compared to the annular space volume to ensure complete filling. Incomplete filling of annular space will not be considered acceptable. CONTRACTOR shall remove pea gravel and reinstall, at his expense, if so ordered by the ENGINEER.

3.06 INSTALLATION OF PIPE UNDER CREEKS BY OPEN CUT METHOD

A. General
   1. Install watermain, fittings, bedding, and rip rap within the pay limits for the creek crossings as shown and specified.
   2. Comply with the applicable requirements of this section as well as other sections of these specifications.
   3. Comply in all respects with the requirements of the applicable permits issued for this project.
   4. Construction of the creek crossings shall be performed within the work limits shown on the plans or specified in the permits. Any other lands, easements, or rights-of-way required by the CONTRACTOR for his operations shall be obtained by the CONTRACTOR at his expense.
   5. All necessary precautions shall be taken to prevent contamination of any wetland or waterway by any soils, sediments, fuels, solvents, lubricants, paints, or any other environmental deleterious materials associated with this project.
   6. Any material dredged in the prosecution of the Work shall be removed evenly, without leaving large refuse piles, ridges across the bed of the waterway, or deep holes that may cause damage to navigable channels or to the banks of the waterway.
   7. Debris or excess material dredged during construction operations shall be completely removed from the bed and banks of all water areas and sent to an approved upland area for disposal.
   8. All sediments are to be retained on the project site through the use of silt fences or other approved sediment traps.
   9. Disturbances to the bed and banks of the creek shall be limited to those areas shown on the plans and covered under the applicable permits.
   10. No work on creek crossings shall be performed immediately after a storm that may cause high water conditions or flooding.
   11. Whenever possible, creek excavation and bank grading shall be carried out by equipment operating on dry land.
   12. Prior to trenching through stream banks, the upland sections of the trench shall be bulkheaded or plugged to prevent drainage of turbid water into the creek.

13. Existing stream banks and vegetation shall be protected as much as possible to prevent bank collapse and erosion.
14. Watermain markers shall be provided on both sides of the creek crossings. Markers shall be flexible, impact resistant fiberglass and royal blue in color. Labels shall be self-adhesive and waterproof.
15. All other applicable requirements of this section shall apply to excavation and backfill of creek crossings.

3.07 TESTING

A. General

Performance testing, leakage, hydrostatic, and proof-of-design tests shall be as specified in Section 15140 - Testing and Disinfection.

B. Testing Criteria

Perform pressure testing to the criteria listed in the table as shown on the Drawings.

C. Ultrasonic Joint Testing.

1. Each joint shall, at the CONTRACTOR'S sole cost and expense, be tested with ultrasonic test equipment prior to being backfilled. If a leak is detected, corrective action shall be taken prior to installing the next pipe.
2. The fact that a point (or joints) has passed the ultrasonic testing does not wave the requirements for the hydrostatic tests described in Section 15140.
3. The testing equipment shall be as manufactured by Moffat Enterprises of Powell Butte, or equal.

3.08 DISINFECTION

A. All watermains, hydrant branches, blow-offs, and ARV piping shall be tested and disinfected in accordance with Section 15140 - Testing and Disinfection.

3.09 GENERAL

A. Install watermain, fittings, and accessories in accordance with applicable sections; as shown on the drawings; and, as specified, required, or directed.

B. Tapping Information

1. All materials as specified herein shall be installed by or under the direction of personnel who are acceptable to the Authority.
    a. Threaded taps shall be made using a machine designed for cutting, threading and inserting the corporation without interruption of service.
        1) Teflon tape may be used on corporation threads.
    b. Tapping sleeve connections shall be made using a machine to cut and remove the segment through the valve without interruption of service.

2. Valve boxes shall be set plumb and shall be independently supported on concrete blocking so no weight will be transmitted to the curb stop or watermain.
3. Service saddles and tapping saddles installed on prestressed concrete cylinder pipe shall be encased in a minimum of 2 inches of concrete mortar after installation.
4. Service saddles shall be used under the following condition:
    a. When water services are placed on 4-inch or smaller pipes.
    b. When water services larger than 1-inch are placed on a 6-inch pipe.
    c. When water services larger than 1-$^1/_2$–inch are placed on an 8-inch pipe.
    d. When water services are tapped to all plastic (PVC) pipe.
    e. When services larger than 1-$^1/_2$-inch are placed on ductile iron pipe.
    f. When water services are tapped to all asbestos-cement pipe.
5. CONTRACTOR is not allowed to excavate, disturb, or park any equipment beyond the Right-of-Way line without prior approval from the property owner.
6. If minimum depth is not achieved for the water service at any location, CONTRACTOR shall either excavate and lower the service or repush/drill the service to the minimum depth, at his expense, until a satisfactory service is installed.
7. Curb boxes are not allowed to be cut for any reason.
8. Repair or replace any connections, which are leaking to ensure a watertight connection.

C. Water Service Tubing
1. Copper tubing shall be installed in accordance with the applicable provisions of Section 02351 - Excavation, Backfill & Trenching, Section 15051 - Buried Piping Installation and Section 15107 - Copper Pipe.
2. Bedding for service connection tubing shall be furnished, installed and coordinated with Section 02316 - Select Granular Materials.

D. Water Service Installations
1. Existing service lines shall be maintained until such time as the proposed watermain has been installed, tested, and disinfected, and approval to place the watermain into service has been obtained. Existing services may then be transferred to the new watermain.
2. New water service installations shall be installed by boring or jacking method under existing roads and pavements. Open-cut of water services across roads will not be allowed.
3. Use tapping machines and equipment compatible with corporation stops and service saddles specified. Use tools and cutting equipment, which minimizes the amount of PVC shavings and remove shavings during tapping; retain coupon, and reduce stress during tapping. Single fluted cutters or twist drills shall not be used for tapping PVC piping.

4. Service locations shown on the drawings are shown schematically only. The actual service locations shall be determined by ENGINEER and CONTRACTOR in the field.
5. For additional information relating to water services, refer to the Drawings.

E. Tapping Watermain.
1. Wet tap connections to existing watermains shall be as shown on the drawings.
2. The person or firm who will be performing the watermain tap shall be acceptable to the Authority.
3. Prior to ordering the tapping sleeve, the CONTRACTOR shall excavate a test pit to the depth required and expose the main to be taped to accurately measure the outside diameter of the main. No tapping sleeve shall be ordered until this information has been obtained.
4. Tapping sleeves shall be suitable for use with the existing pipe to be tapped. Tapping sleeve shall be compatible with the tapping valve furnished.
5. Thrust blocks shall be constructed behind the wet tap connection as shown on the drawings and specified herein.
6. Refer to Section 15140 for additional requirements for tapping sleeve and valve testing.
7. After each tap has been completed, the CONTRACTOR shall keep the tapping area uncovered for a minimum period of one (1) hour to determine if any leakage is occurring. If any leakage has occurred, the tap shall be made watertight in a manner approved by the ENGINEER.
8. A full pipe coupon shall be retained as a result of the tapping operation.
9. The valves shall be kept closed until approval from the ENGINEER is given to open the valve.

F. Discrepancies
1. If discrepancies occur between the Drawings and field conditions, the CONTRACTOR shall notify the ENGINEER immediately.
2. The CONTRACTOR shall not proceed with the installation in areas of discrepancy until said discrepancy is resolved.

END OF SECTION

SECTION 15101

PARTIAL LEAD SERVICE REPLACEMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

The work specified shall include all labor, materials, tools, equipment, services and incidentals necessary to furnish and install new service connections when the existing water service is made of lead.

B. Related Work Specified Elsewhere

1. Section 15051 - Buried Piping Installation
2. Section 15120 - Piping Specialties and Accessories
3. Section 15140 - Testing and Disinfection

1.02 QUALITY ASSURANCE

A. Reference Standards

1. ANSI/AWWA CB10-17, Replacement and Flushing of Lead Service Lines
2. 1996 Safe Drinking Water Act
3. EPA Lead and Copper Rule (LCR)
4. New York State Department of Health, Part 5, Subpart 5.1 Public Water Systems
5. Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1025 and 29 CFR Part 1928
6. “Notification and Reporting Requirements for Partial Lead Service Line Replacement under the Lead and Copper Rule”, published by the Environmental Protection Agency (EPA), April 2000
7. ASTM B32, Specification for Solder Metal
8. NSF/ANSI Standard 61
9. Underwriter’s Laboratories (UL)
10. International Organization for Standardization (ISO)
11. Factory Mutual Research Corporation
12. National Fire Protection Association

PART 2 - PRODUCTS

2.01 MATERIALS

A. Refer to Section 15051 for copper piping materials.

B. Refer to Section 15105 for polyethylene piping materials.

PART 3 - EXECUTION

3.01 GENERAL

A. Lead Service Replacement Procedure.

The CONTRACTOR shall comply with the following procedure when a lead service is identified during construction.

1. Once a lead service is identified, the CONTRACTOR shall stop work on the replacement and notify both the ENGINEER and the OWNER in writing. OWNER will notify the customer of the existence of the lead service.
2. ENGINEER is responsible for documenting the lead service by taking photographs and measurements of the service location. The limits of lead piping shall also be determined and documented. ENGINEER shall provide the documentation of the lead service to the OWNER.
3. Once documentation is complete, CONTRACTOR shall carefully backfill the excavation minimizing disturbance/vibration to the lead service line.
4. CONTRACTOR shall flush the water service for at least ten (10) minutes using an external hose bib. If an external hose bib is not available, CONTRACTOR shall ask the customer if they can run the water inside the house at an upstairs sink for a minimum of ten (10) minutes for flushing purposes.
5. OWNER will advise ENGINEER and CONTRACTOR of the procedure to replace the service line to meet current ECWA and AWWA standards.

B. Payment

1. No separate payment shall be made for lead service replacements. All costs for work included herein shall be included in the various service replacement items.

END OF SECTION

SECTION 15105

POLYETHYLENE TUBING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

The work specified shall include all labor, materials, tools, equipment, services and incidentals necessary to furnish and install new polyethylene tubing and fittings as shown, specified and required.

B. Related Work Specified Elsewhere

1. Section 15051 - Buried Piping Installation
2. Section 15120 - Piping Specialties and Accessories
3. Section 15140 - Testing and Disinfection

1.02 QUALITY ASSURANCE

A. Manufacturer's Qualifications

1. Manufacturer shall have a minimum of 5 years experience producing polyethylene tubing, fittings and appurtenances, and shall show evidence of at least 5 installations in satisfactory operation.
2. Parts Interchangeability: It is the intent of these specifications that all materials furnished herein shall be compatible with similar materials of other manufacturers.

B. Reference Standards

1. AWWA C901 – Polyethylene (PE) Pressure Pipe and Tubing, ½ in. (13mm) through 3 in. (76 mm) for Water Service.
2. ANSI Z171.1 – American National Standard for Preferred Numbers.
3. ASTM D638 – Standard Test Method for Tensile Properties of Plastics.
4. ASTM D792 – Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
5. ASTM D1238 – Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer.
6. ASTM D1505 – Standard Test Method for Density of Plastics by the Density-Gradient Technique.
7. ASTM D1598 – Standard Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure.
8. ASTM D1599 – Standard Test Method for Short Time Hydraulic Failure Pressure of Plastic Pipe, Tubing, and Fittings.
9. ASTM D1603 – Standard Test Method for Carbon Black in Olefin Plastics.
10. ASTM D2122 – Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings.

11. ASTM D2239 – Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter.
12. ASTM D2737 – Standard Specification for Polyethylene (PE) Plastic Tubing.
13. ASTM D2837 – Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials.
14. ASTM D3035 – Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.
15. ASTM D3350 – Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
16. ASTM D4218 – Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique.
17. ASTM F412 – Standard Technology Relating to Plastic Piping Systems.
18. AWWA Manual of Water Supply Practices M55: *PE Pipe – Design and Installation.*
19. CSA B137.1 – Polyethylene Pipe, Tubing and Fittings for Cold Water Pressure Services.
20. NSF/ANSI 60 – Drinking Water Treatment Chemicals – Health Effects.
21. NSF/ANSI 61 – Drinking Water System Components – Health Effects.
22. PPI TR3 – Policies and Procedures for Developing Hydrostatic Design Basis (HDB), Pressure Design Basis (PDB), Strength Design Basis (SDB), and Minimum Required Strengths (MRS) Ratings for Thermoplastic Piping Materials for Pipe.
23. PPI TR4 – PPI Listing of Hydrostatic Design Basis (HDB), Strength Design Basis (SDB), Pressure Design Basis (PDB) and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials for Pipe.
24. Underwriter's Laboratories (UL)
25. International Organization for Standardization (ISO)
26. National Fire Protection Association
27. 1996 Safe Drinking Water Act

1.03 SUBMITTALS

A. Shop Drawings: Submit for approval the following:
   1. Detailed drawings and data on pipe, fittings and accessories.
   2. A materials list, which shall include full information regarding all components of the equipment. Materials of construction shall be presented in the listing.
   3. Any operations and maintenance information for polyethylene tubing.

B. Submit certificates of compliance with the applicable referenced standards.

C. Submit certificate of compliance with NSF/ANSI Standard 61 for all products under this section, including interior coatings, by an independent, authorized laboratory.

D. Furnish delivery tickets indicating the pipe manufacturer, pipe type and class, identifying that the pipe was new and from a manufacturer that has been submitted and approved.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. During delivery and handling, all materials shall be braced and protected from any distortion or damage; any such distortion or damage shall be basis for rejection of the materials.

B. The materials shall be inspected before unloading. Materials that are found to be cracked, gouged, chipped, dented, or otherwise damaged will not be accepted.

C. Interiors of pipe, fittings and appurtenances shall be kept free from dirt and foreign matter.

D. Store pipe and fittings so they are not in contact with the ground.

PART 2 - PRODUCTS

2.01 MATERIALS

A. All products, including interior coatings, shall be suitable for use in a potable water system.

B. All products, including wetted parts, shall be certified to meet NSF/ANSI Standard 61.

C. All polyethylene tubing shall be material code PE 4710, having a Pressure Class (PC) of 250, a Standard Dimension Ratio (SDR) of 9.0, and a Standard Internal Dimension Ratio (SIDR) of 7.0.

D. All piping and fittings shall be designed for a working pressure and field hydrostatic test pressure as shown in Section 15051, Buried Piping Installation.

E. All polyethylene tubing and accessories must be new materials in first-class condition. Used or recycled materials will not be allowed, regardless of condition.

F. All polyethylene tubing shall meet the requirements of AWWA C901 and be appropriate for use in a potable water system.

2.02 MARKING

A. All items shall be marked or labeled with the following information:
   1. Material designation code.
   2. AWWA Pressure Class.

3. Standard Dimension Ratio (SDR) and Standard Inside Dimension Ratio (SIDR).
4. Size and schedule.
5. ASTM specification number.
6. Name and location of supplier.

B. All polyethylene tubing shall include an attached metal tracer wire for locating tubing after installation.

2.03 JOINTING

A. All joints shall conform to manufacturer's recommendations and shall be made by skilled workmen.

B. Joints shall develop full strength and shall be stronger than the pipe joined.

PART 3 - EXECUTION

3.01 GENERAL

A. Refer to Section 15051 for piping installation.

B. All connections to polyethylene tubing shall be watertight at operating pressure.

C. Polyethylene Tubing
1. Polyethylene tubing shall be installed in accordance with the applicable provisions of Section 02351, Excavation, Backfill and Trenching and Section 15051, Buried Piping Installation.
   a. No coupling shall be allowed, especially under paved areas. Exception shall be based on the length of the service and the size of the coil of tubing provided and shall be only as allowed by ENGINEER.
   b. Installation shall be suitable for open-cut or push or drill methods.
   c. Install polyethylene tubing as per manufacturer's recommendations.
2. Exposed polyethylene tubing shall be carefully erected and neatly arranged.
   a. Polyethylene tubing shall be run parallel with walls inside structures and shall be pitched to drain.
   b. Drain valves shall be installed at the low points of liquid filled systems.
   c. Joints shall be fused, suitable for the pressure intended.

END OF SECTION

SECTION 15106

DUCTILE IRON PIPE, FITTINGS, AND ACCESSORIES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

The work specified shall include all labor, material, equipment, tools, services and incidentals necessary to furnish and install ductile iron pipe, fittings and appurtenances as shown, specified and required.

B. Pipe Schedule

1. Hydrant piping:
    a. Pipe Class 53.
    b. All joints are to be restrained and only as follows:
        1) Mechanical joint pipe and fittings utilizing wedge action retainer glands.
        2) Anchor pipe and anchor fittings.
2. 4-inch through 12-inch watermain (except hydrant piping):
    a. Pipe class 52.
    b. Non-restrained joints
        1) Bell and spigot push-on joint pipe.
    c. Restrained joints utilizing one of the following:
        1) Mechanical joint pipe and fittings utilizing wedge action retainer glands.
        2) Bell and spigot push-on joint pipe with ductile iron pipe wedge action restraining devices and mechanical joint fittings utilizing wedge action retainer glands.
        3) Flexible restrained joint pipe and fittings utilizing patented ductile iron locking segment(s) or flex ring with factory applied spigot retainer weldment.
        4) Flexible restrained joint pipe utilizing patented ductile iron locking segment(s) or flex ring with factory applied spigot retainer weldment and mechanical joint fittings utilizing wedge action retainer glands.
3. 16-inch and larger watermain:
    a. Pipe Class 54.
    b. Non-restrained joints:
        1) Bell and spigot push-on joint pipe.
    c. Restrained joints, utilizing one of the following:
        1) Flexible restrained joint pipe and fittings utilizing patented ductile iron locking segment(s) or flex ring with factory applied spigot retainer weldment.

2) Flexible restrained joint pipe utilizing patented ductile iron locking segment(s) or flex ring with factory applied spigot retainer weldment and mechanical joint fittings utilizing wedge action retainer glands.

4. Watermain installed by Horizontal Directional Drilling:
   a. Pipe Class 53
   b. All pipe joints are to be restrained by use of boltless and flexible restraint joint pipe utilizing patented ductile iron locking segment(s) or flex ring with factory applied retainer weldment. If fittings are part of the Horizontal Directional Drill, they shall be flexible restraint joints utilizing patented ductile iron locking segment(s) or flex ring with factory applied spigot retainer weldment.
5. Flanged pipe watermain, all sizes:
   a. Pipe Class 53.
   b. Flanged joints are for non-buried applications.

C. Related Work Specified Elsewhere
1. Section 02080 - Fire Hydrants
2. Section 15051 - Buried Piping Installation
3. Section 15110 - Valves and Appurtenances
4. Section 15120 - Piping Specialties and Accessories
5. Section 15140 - Testing and Disinfection

1.02 QUALITY ASSURANCE

A. Manufacturer's Qualifications
1. Manufacturer shall have a minimum of 5 years experience producing ductile iron pipe, fittings and accessories, and shall show evidence of at least 5 installations in satisfactory operation.
2. Parts Interchangeability: It is the intent of these specifications that all materials furnished herein shall be compatible with similar materials of other manufacturers.

B. Reference Standards
1. AWWA C104, American National Standard for Cement-Mortar Lining for Ductile Iron Pipe and Fittings for Water
2. AWWA C105, American National Standard for Polyethylene Encasement for Ductile Iron Pipe Systems
3. AWWA C110, American National Standard for Ductile-Iron and Gray-Iron Fittings, 3-inch through 48-inch, (75 mm through 1200 mm), for Water and Other Liquids
4. AWWA C111, American National Standard for Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings
5. AWWA C115, American National Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges

6. AWWA C150, American National Standard for Thickness Design of Ductile-Iron Pipe
7. AWWA C151, American National Standard for Ductile Iron Pipe, Centrifugally Cast, for Water
8. AWWA C153, American National Standard for Ductile-Iron Compact Fittings. 3 In. Through 24 In. (76 mm through 610 mm) and 54 In. Through 64 In. (1400 mm through 1600 mm), for Water Service
9. ANSI B16.1, Cast Iron Pipe Flanges and Flanged Fittings
10. ANSI B1.20, Pipe, Threads, General Purpose (Inch)
11. ANSI B18.2.1, Square and Hex Bolts and Screws Inch Series, Including Hex Cap Screws and Lag Screws
12. ANSI B18.2.2, Square and Hex Nuts
13. ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
14. ASTM A354, Specification for Quenched and Tapered Alloy Steel Bolts, Studs and Other Externally Threaded Fasteners
15. ASTM A536 Standard Specification for Ductile Iron Castings
16. NSF/ANSI Standard 61
17. Underwriter's Laboratories (UL)
18. International Organization for Standardization (ISO)
19. Factory Mutual Research Corporation
20. 1996 Safe Drinking Water Act

1.03 SUBMITTALS

A. Shop Drawings: Submit for approval the following:
   1. Detailed drawings and data on pipe, fittings and accessories.
   2. A materials list, which shall include full information regarding all components of the equipment. Materials of construction shall be presented in the listing.

B. Laying Schedules or drawings when requested or required or when custom pieces or specially marked pipe is used. Field closures and field cuts, and manner of restrained joints shall be shown.

C. Submit certificates of compliance with the applicable referenced standards.

D. Submit certificate of compliance with NSF/ANSI Standard 61 for all products under this section, including interior coatings, by an independent, authorized laboratory.

E. Furnish delivery tickets indicating the pipe manufacturer, pipe type and class, identifying that the pipe was new and from a manufacturer that has been submitted and approved.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. During delivery and handling, all materials shall be braced and protected from any distortion or damage; any such distortion or damage shall be basis for rejection of the materials.

B. Equipment used for unloading shall be covered with wood or rubber to avoid damage to the exterior of the pipe, fittings and accessories. Furthermore, all ductile iron pipe requiring polyethylene encasement as per Section 2.02.B, where the polyethylene has been field pre-applied to the pipe shall be handled with suitably padded equipment to prevent damage to the coating. Do not drop or roll materials off trucks. All ductile iron pipe and fittings shall be handled with padded slings or other appropriate equipment. The use of cables, hooks or chains will not be permitted.

C. The materials shall be inspected before and after unloading. Materials that are found to be cracked, gouged, chipped, dented or otherwise damaged will not be accepted.

D. Interiors of pipe, fittings and accessories shall be kept free from dirt and foreign matter.

E. Store pipe and fittings on heavy wood blocking or platforms so they are not in contact with the ground.

F. Pipe, fittings, and specials shall be unloaded opposite to or as close to the place where they are to be used as is practical to avoid unnecessary handling.

1.05 PIPE INSTALLATION SPECIALIST

A. A factory trained and certified manufacturer's pipe installation specialist shall be present during CONTRACTOR start-up and for a total of 5 working days when pipe laying is in progress and thereafter shall be available during the course of the project to assist the OWNER, ENGINEER, and/or CONTRACTOR when requested by the OWNER, ENGINEER and/or CONTRACTOR. This field service shall be at no cost to the OWNER. This can include field review of pipe/fittings when requested by the OWNER, ENGINEER, and/or CONTRACTOR.

B. The specialist shall submit three (3) copies of a written report to the ENGINEER presenting the findings of each visit. As a minimum, each report should include the following: date, day, time, purpose of the visit (and who initiated the visit), weather conditions, CONTRACTOR'S name, project name and the contract number, ENGINEER'S name, individuals contacted, location visited (station, street, field office, ENGINEER'S main office, OWNER'S office CONTRACTOR'S office, etc.), and any other pertinent information related to the visit (such as the results of individual pipe/fitting inspections, etc.)

PART 2 - PRODUCTS

2.01 MATERIALS

A. General

1. All products, including interior coatings shall be suitable for use in a potable water system.
2. All products, including wetted parts, shall be certified to meet NSF/ANSI Standard 61.
3. All ductile iron pipe, fittings and accessories shall be designed for a working pressure and field hydrostatic test pressure as shown in Section 15051, Buried Piping Installation.
4. All ductile iron pipe, fittings, and accessories must be new materials in first-class condition. Used or recycled materials shall not be allowed, regardless of condition.
5. All ductile iron pipe shall be provided from the same manufacturer.
6. Pipe shall be fully gauged.
7. Pipe shall be furnished in nominal laying lengths of 18 or 20 feet unless otherwise specified.
8. Pipe and fittings shall be lined with cement mortar lining in accordance with AWWA C104, except it shall be double thickness and a bituminous seal coat meeting NSF/ANSI Standard 61. The exterior shall be provided with a bituminous coating in accordance with AWWA C151. Fittings may be lined with an NSF/ANSI Standard 61 approved fusion bonded epoxy meeting the applicable sections of AWWA C116.
9. Bonded joints may be required in areas where the ENGINEER has evaluated soil conditions and has recommended that corrosion protection is required at locations as shown on the drawings. The pipe manufacturer shall supply all joint bonding materials, including #4 AWG stranded insulated copper wire bonding jumpers.

B. Ductile Iron Mechanical Joint Pipe and Fittings

1. Ductile Iron Mechanical Joint Pipe:
    a. Pipe shall be centrifugally cast ductile iron conforming to the requirements of AWWA C151 for material, dimensions, tolerance, tests, markings and other requirements.
    b. Manufacturer:
        1) American Cast Iron Pipe Co.,
        2) Atlantic States, Inc.,
        3) Clow - A Division of McWane, Inc.,
        4) Griffin,
        5) US Pipe.
2. Ductile Iron Mechanical Joint Fittings:
    a. Tees, bends, elbows, reducers, increasers, offsets and other such fittings shall be mechanical joint ductile iron compact body conforming to AWWA C110 or AWWA C153, as specified.
    b. Reducers shall be concentric or eccentric where specified.

c. Fittings shall be suitable for use with polyvinyl chloride pressure pipe.

d. Manufacturer:

1) American Cast Iron Pipe Co.,
2) Clow - A Division of McWane, Inc.,
3) Griffin,
4) Sigma Corp.,
5) Star Pipe Products, Inc.
6) Tyler - A Division of McWane, Inc.,
7) US Pipe.

3. Joints for Ductile Iron Mechanical Joint Pipe and Fittings:

a. Joints shall conform to AWWA C111 and shall be mechanical joint bell and spigot and be furnished complete with all necessary accessories consisting of ductile iron follower glands, plain tipped rubber gaskets, nuts and bolts, unless otherwise specified.

b. Fittings shall have mechanical joint ends and be furnished with all necessary joint accessories consisting of ductile iron follower glands, (or cast iron glands for cast iron fittings), plain tipped rubber gaskets, nuts and bolts, unless otherwise specified. Split follower glands shall be furnished and installed only when approved by the ENGINEER.

c. All nuts and tee bolts for mechanical joint accessories shall be stainless steel or fluorocarbon coated as specified herein.

4. Restrained Joints for Ductile Iron Mechanical Joint Pipe and Fittings:

a. Restrained joints for mechanical joint pipe and fittings shall be made by restraining the pipe on each side of the fitting for all joints along the length of pipe as shown, specified or required.

b. Restraining shall be accomplished at the mechanical joint fitting by use of a mechanical joint wedge action retainer that incorporates mechanical joint restraint into the design of the follower gland with individually actuated wedges that are tightened against the barrel of the pipe, as specified herein.

C. Push-On Ductile Iron Pipe and Fittings

1. Push-On Ductile Iron Pipe:

a. Pipe shall be centrifugally cast ductile iron conforming to the requirements of AWWA C151 for material, dimensions, tolerance, tests, markings and other requirements.

b. Manufacturer:

1) American Cast Iron Pipe Co.,
2) Atlantic States, A Division of McWane, Inc.,
3) Clow - A Division of McWane, Inc.,
4) Griffin,
5) US Pipe.

2. Fittings:

a. Tees, bends, elbows, reducers, increasers, offsets and other such fittings shall be mechanical joint ductile iron compact body

conforming to AWWA C110 or AWWA C153 and as specified herein.

3. Joints for Push-On Ductile Iron Pipe and Fittings:
   a. Joints shall conform to AWWA C111 and shall be bell and spigot and be furnished complete with circular rubber gaskets, and other accessories as necessary for a complete installation.
   b. Fittings shall have mechanical joint ends and be furnished with all necessary joint accessories consisting of ductile iron follower glands, (cast iron glands for cast iron fittings), plain tipped rubber gaskets, nuts and bolts, unless otherwise specified. Split follower glands shall be furnished and installed only when approved by the ENGINEER.
   c. All nuts and tee bolts for mechanical joint accessories shall be stainless steel or fluorocarbon coated as specified herein.

D. Ductile Iron Flexible Restraint Joint Pipe and Fittings and/or Mechanical Joint Fittings
   1. Ductile Iron Flexible Restraint Joint Pipe:
      a. Pipe shall be centrifugally cast ductile iron conforming to the requirements of AWWA C151 for material, dimensions, tolerance, tests, markings, and other requirements.
      b. Restrained joint pipe shall be designed for a water working pressure of 350 psi for pipe sizes 4-inch through 20-inch and 250 psi for pipe sizes 24-inch through 54-inch.
      c. Flexible restraint joints shall consist of a boltless, glandless restraining system with factory applied spigot weld ring or weldment (weld bead of established height and width), which retains the wedge-shaped locking segments. These locking segments are either inserted into the bell prior to spigot engagement or inserted after spigot engagement by “caulking” a snap-ring into the bell, or inserting the segments through slots cast into the bell face.
      d. Pipe that utilizes gaskets with embedded restraining gripper or friction segments is not acceptable.
      e. Field applied weldments or weldments applied in a shop other than at the manufacturing facility are not allowed. Field cuts shall be restrained by cutting the barrel of the pipe and inserting it into a mechanical joint fitting and using wedge action retainer glands. As an alternative, flexible restrained closures may be incorporated into the Work provided they are accounted for in the approved laying schedule.
      f. Manufacturer:
         1) American Cast Iron Pipe Co. - Flex Ring,
         2) Clow - Super Lock,
         3) US Pipe - TR Flex,
         4) Or approved equal.

2. Ductile Iron Restrained Fittings and Mechanical Joint Fittings:
    a. All ductile iron fittings shall meet the requirements of AWWA C153 or AWWA C110.
    b. Fittings may be either flexible restraint joint or mechanical joint. If flexible restraint joint fittings are used, a certain number of fittings must be mechanical joint to allow for field adjustments in line or grade.
    c. Fittings that utilize gaskets with embedded restraining gripper or friction segments are not acceptable.
    d. Field applied weldments or weldments applied in a shop other than at the manufacturing facility are not allowed.
    e. Manufacturer of Flexible Restraint Joint Fittings:
        1) American Cast Iron Pipe Co. - Flex Ring,
        2) Clow - Super Lock,
        3) US Pipe - TR Flex,
        4) Or approved equal.
    f. Manufacturer of Mechanical Joint Fittings:
        1) American Cast Iron Pipe Co.,
        2) Clow - A Division of McWane, Inc.,
        3) Griffin,
        4) Sigma Corp.,
        5) Star Pipe Products, Inc.
        6) Tyler - A Division of McWane, Inc.,
        7) US Pipe.

E. Ductile Iron Anchor Pipe and Fittings
    1. Ductile iron anchor pipe and fittings shall provide positive joint restraint by incorporating an integrally cast anchor gland (stop shoulder) at one end and an anchor, mechanical joint or plain end at the other end. The plain end, when fitted with a standardized mechanical joint gasket is to be inserted into a mechanical joint bell and bolted tight. A split, rotating ring shall be provided on the elbows, tees and on one end of the couplings or anchor pipe to permit vertical alignment regardless of the mating bolt hole alignment.
        a. Pipe shall be centrifugally cast ductile iron conforming to the applicable requirements of AWWA C151 for material, dimensions, tolerance, tests, markings and other requirements.
        b. Fittings shall conform to the applicable requirements of AWWA C110 or AWWA C153.
        c. Anchor pipe shall be furnished in lengths from 18-inches to 18 feet as shown or specified.
        d. Pipe and fittings shall be furnished complete with circular rubber gaskets conforming to AWWA C111, and other accessories as necessary for a complete installation.
        e. Manufacturer:
            1) Tyler - A Division of McWane, Inc.,
            2) Clow - A Division of McWane, Inc.

F. Ductile Iron Flanged Pipe and Fittings

1. Ductile Iron Pipe with Threaded Flanges:
    a. Pipe shall be centrifugally cast ductile iron conforming to the requirements of AWWA C151 and C115 for material, dimensions, tolerance, tests, markings, and other requirements.
    b. Pipe barrels and flanges shall have a taper pipe thread (NPT) in accordance with ANSI B1.20.1, with pipe diameters adapted to ductile iron pipe standard outside diameters.
    c. Flanged pipe shall be minimum Class 53 thickness and shall be furnished in standard laying lengths as specified or required.
    d. Manufacturer:
        1) American Cast Iron Pipe Co.,
        2) Clow - A Division of McWane, Inc.,
        3) US Pipe,
        4) Fast Fabricators, Inc.
2. Ductile Iron Flanged Fittings:
    b. Tees, bends, elbows, reducers, increasers and other such fittings shall be flanged ductile iron in accordance with the requirements of AWWA C110 and shall conform to ANSI A21.10, 250 psi rating.
    c. Reducers shall be eccentric unless otherwise specified.
    d. Manufacturer:
        1) American Cast Iron Pipe Co.,
        2) Clow - A Division of McWane, Inc.,
        3) Griffin,
        4) Sigma Corp,
        5) Tyler - A Division of McWane, Inc.,
        6) Union Foundry Co., A Division of McWane, Inc.
        7) US Pipe.
3. Joints for Ductile Iron Flanged Pipe and Fittings:
    a. Flanged joints shall conform to the requirements of AWWA C110 and drilling and facing of flanges shall be in accordance with ANSI B16.1 Class 125 flanges unless otherwise specified.
    b. Flanged ductile iron pipe and fittings shall be furnished complete with all necessary joint accessories consisting of natural or synthetic rubber gaskets, $^{1}/_{8}$-inch thick, full face; and, nuts, bolts and washers, unless otherwise specified.
    c. All nuts, bolts and washers for flanges and accessories shall conform to ANSI B18.2.1 and ANSI B18.2.2, respectively and shall be Type 304 stainless steel, high strength, low alloy steel or fluorocarbon coated as specified herein.

G. Accessories

1. Flange Fillers, Blind Flanges and Reducing Companion Flanges:
    a. Conform to the requirements of AWWA C115 for material, dimensions, tolerance, tests, markings and other requirements.
    b. Drilling and facing of flanges shall be in accordance with ANSI B16.1, Class 125 flanges unless otherwise specified.

c. Flanged fillers, blind flanges and reducing companion flanges shall be furnished complete with all necessary joint accessories consisting of natural or synthetic rubber gaskets, $^{1}/_{8}$-inch thick, full face; and, nuts, bolts and washers, unless otherwise specified.

d. Threaded outlets or taps, (Mueller threads), shall be provided in blind flanges as specified or required.

e. All nuts, bolts and washers for flanges and accessories shall conform to ANSI B18.2.1 and ANSI B18.2.2, respectively and shall be Type 304 stainless steel, high strength, low alloy steel.

2. Caps and Plugs:

a. Conform to the requirements of AWWA C110 for material, dimensions, tolerance, tests, markings and other requirements.

b. Caps and plugs shall be mechanical joint or push-on joint and be furnished with all necessary joint accessories consisting of ductile iron follower glands, plain tipped rubber gaskets, nuts and bolts, unless otherwise specified.

c. All nuts and tee bolts for mechanical joint accessories shall be fluorocarbon coated as specified herein.

d. Threaded outlets or taps, (Mueller threads), shall be provided in plugs and caps as specified or required.

3. Solid Mechanical Joint Sleeves:

a. Conform to the requirements of AWWA C153 for material, dimensions, tolerance, tests, markings, and other requirements of mechanical joint class 350 ductile iron solid sleeves.

b. Unless otherwise specified, provide long laid length sleeves complete with follower glands, rubber gaskets and fluorocarbon coated nuts, tee bolts, and accessories.

4. Manufacturer

a. American Cast Iron Pipe Co.,

b. Clow - A Division of McWane, Inc.,

c. Griffin,

d. Sigma Corp.,

e. Star Pipe Products,

f. Tyler - A Division of McWane, Inc.,

g. US Pipe.

H. Mechanical Joint Wedge Action Retainer Gland

1. Restraint shall be accomplished by use of a retainer gland that incorporates mechanical joint restraint into the follower gland with individually actuated wedges that increase their resistance to pull-out as pressure or external forces increase.

2. The joint restraint ring and its wedging components shall be made of grade 65-45-12 ductile iron conforming to ASTM A536. The wedges shall be ductile iron heat treated to a minimum hardness of 370 BHN. T-bolts shall be fluorocarbon coated as specified herein.

3. Dimensions of the gland shall be such that it can be used with the standardized mechanical joint bell conforming to AWWA C111 and AWWA C153.
4. Torque limiting twist off nuts shall be used to insure the proper actuation of the wedges. When the nut is sheared off, a standard hex head shall remain.
5. Manufacturer, for use on ductile iron pipe:
    a. EBAA Iron, Series 1100 MEGALUG,
    b. Uni-Flange Series 1400,
    c. SIGMA One-Lok,
    d. Star Pipe products – Stargrip.

I. Push-On Ductile Iron Pipe Joint Restraining Device
1. When specified or allowed by the ENGINEER, restraining push-on ductile iron pipe joints shall be accomplished by use of a joint restraint system that consists of restraining rods and split ductile iron clamping rings, installed on the spigot and behind the bell. The clamping ring shall incorporate a series of machined serrations on the inside surface to provide 360 degree contact and support of the pipe barrel. Lateral thrust restraint is provided when the side clamping bolts are tightened allowing the serrations to lock onto the pipe barrel.
2. Threaded restraining rods and bolts and clamping bolts and nuts shall be fluorocarbon coated or type 304 stainless steel.
3. The joint restraint rings shall be made of high strength, grade 65-45-12 ductile iron conforming to ASTM A536.
4. Dimensions of the gland shall be such that it can be used with the standardized mechanical joint bell conforming to AWWA C111 and AWWA C153.
5. Restraining push-on joints as specified herein shall not be allowed for hydrant branches.
6. Restraining push-on joints shall be used on pipe sizes 6-inch to 12-inch only when allowed or specified. Restraining push-on joints in this manner shall not be allowed on pipe larger than 12 inches.
7. Manufacturer, for use on ductile iron pipe:
    a. Uni-Flange Series 1450,
    b. EBAA Series 1700,
    c. Or approved equal.

J. Fluorocarbon Coated Nuts and Bolts
1. T-bolts shall be heat treated ductile iron material with a minimum of 65,000 psi tensile strength and 45,000 psi yield strength meeting ANSI/AWWA C111/A21-95.
2. Nuts and bolts shall have a fluorocarbon SC-1 coating.
3. Manufacturer:
    a. Standco Industries,
    b. Or approved equal.

K. Threaded Harnessing Rods and Bolting Accessories

1. Threaded harnessing rods shall only be used when approved by the ENGINEER.
2. Harness rods and nuts shall be heat treated steel with a minimum yield strength of 70,000 psi and a minimum ultimate strength of 110,000 psi.
3. Threads shall conform to American Standard Course Threads.
4. Rods and nuts shall be galvanized or cadmium plated, unless otherwise specified.
5. Non-coated materials may be protected with the application of two (2) coats of a bituminous preservative coating after installation.
6. Oil, grease, paint, or any coating, which requires drying will not be acceptable.

2.02 COATINGS, LININGS, AND POLYETHYLENE ENCASEMENT FOR DUCTILE IRON PIPE AND FITTINGS

A. Coatings and Linings for Ductile Iron Joint Pipe and Fittings

1. Ductile iron pipe and fittings shall be lined with a bituminous seal coated cement-mortar lining in accordance with AWWA C104, except the thickness for pipe shall be double that specified.
2. Ductile iron pipe and fittings shall be coated on the outside with a bituminous coating, approximately one millimeter thick. Fittings may be lined with an NSF/ANSI Standard 61 approved fusion bonded epoxy meeting the applicable sections of AWWA C116.
3. The exterior of flanged ductile iron pipe and fittings for exposed piping shall be coated with a primer coating suitable to receive epoxy paint finish paint system.

B. Polyethylene Encasement For Ductile Iron Pipe and Fittings

1. Polyethylene encasement shall be used for ductile iron pipe and fittings and on ductile iron fittings when using PVC pipe, conforming to AWWA Specification C105.
2. Polyethylene film shall be manufactured of virgin polyethylene material conforming to the following requirements of ASTM Standard Specification D1248 - Polyethylene Plastics Molding and Extrusion Materials.
3. Polyethylene film shall have a tensile strength of 1,200 psi minimum and shall allow elongation of 300 percent minimum and have a dielectric strength of 800 V/mil thickness minimum.
4. Polyethylene film shall have a minimum nominal thickness of 0.008 in (8 mils). The minus tolerance of thickness shall not exceed 10 percent of the nominal thickness.
5. Tape required to complete the installation shall be approximately two (2) inches wide, plastic backed adhesive tape such as Polyken #900, Scotchrap #50 or approved equal.
6. Tube size or sheet width for each size of pipe shall be in accordance with AWWA C-105.

C. Polyethylene Encasement for Ductile Iron Pipe to be Installed by Horizontal Driectional Drilling (HDD)

1. Ductile iron pipe to be installed by horizontal directional drilling (HDD) shall be installed with a double polyethylene encasement per AWWA C105. "Method A" shall be used for installations below the water table. Only polyethylene encasement meeting all material requirements of AWWA C105 shall be used.
2. Polyethylene film shall be manufactured of virgin polyethylene material conforming to the following requirements of ASTM Standard Specification D1248 – Polyethylene Plastics Molding and Extrusion Materials.
3. Polyethylene film shall have a tensile strength of 1,200 psi minimum and shall allow elongation of 300 percent minimum and have a dielectric strength of 800 V/mil thickness minimum.
4. Polyethylene film shall have a minimum nominal thickness of 0.008 in (8 mils). The minus tolerance of thickness shall not exceed 10 percent of the nominal thickness.
5. Tape required to complete the installation shall be approximately two (2) inches wide, plastic backed adhesive tape, such as Polyken #900, Scotchrap #50, or approved equal.
6. Tube size or sheet width for each size of pipe shall be in accordance with AWWA C-105.

PART 3 - EXECUTION

3.01 GENERAL

A. Refer to Section 15051 for buried piping installation.

END OF SECTION

SECTION 15107

COPPER PIPE

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

The work specified shall include all labor, materials, tools, equipment, services and incidentals necessary to furnish and install new copper pipe and fittings as shown, specified and required.

B. Related Work Specified Elsewhere

1. Section 15051 - Buried Piping Installation
2. Section 15120 - Piping Specialties and Accessories
3. Section 15140 - Testing and Disinfection

1.02 QUALITY ASSURANCE

A. Manufacturer's Qualifications

1. Manufacturer shall have a minimum of 5 years experience producing copper pipe, fittings and appurtenances, and shall show evidence of at least 5 installations in satisfactory operation.
2. Parts Interchangeability: It is the intent of these specifications that all materials furnished herein shall be compatible with similar materials of other manufacturers.

B. Reference Standards

1. ASTM B32, Specification for Solder Metal
2. ASTM B42, Specification for Standard Size Seamless Copper Pipe
3. ASTM B68, Specification for Bright Annealed Seamless Copper Tube
4. ASTM B75, Specification for Seamless Copper Tube
5. ASTM B88, Specification for Seamless Copper Water Tube
6. ASTM B302, Specification for Threadless Copper Pipe
7. ASTM B306, Specification for Copper Drainage Tube (DWV)
8. NSF/ANSI Standard 61
9. Underwriter's Laboratories (UL)
10. International Organization for Standardization (ISO)
11. Factory Mutual Research Corporation
12. National Fire Protection Association
13. ASME, Boiler and Pressure Vessel Code
14. Federal Specification WW-P-377D(1), Pipe, Copper, Seamless Standard Sizes (S/S by ASTM B42)
15. ANSI B16.22, Wrought Copper and Bronze Solder - Joint Pressure Fittings
16. 1996 Safe Drinking Water Act

1.03 SUBMITTALS

A. Shop Drawings: Submit for approval the following:
   1. Detailed drawings and data on pipe, fittings and accessories.
   2. A materials list, which shall include full information regarding all components of the equipment. Materials of construction shall be presented in the listing.
   3. Any operations and maintenance information for copper pipe.

B. Submit certificates of compliance with the applicable referenced standards.

C. Submit certificate of compliance with NSF/ANSI Standard 61 for all products under this section, including interior coatings, by an independent, authorized laboratory.

D. Furnish delivery tickets indicating the pipe manufacturer, pipe type and class, identifying that the pipe was new and from a manufacturer that has been submitted and approved.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. During delivery and handling, all materials shall be braced and protected from any distortion or damage; any such distortion or damage shall be basis for rejection of the materials.

B. The materials shall be inspected before unloading. Materials that are found to be cracked, gouged, chipped, dented, or otherwise damaged will not be accepted.

C. Interiors of pipe, fittings and appurtenances shall be kept free from dirt and foreign matter.

D. Store pipe and fittings so they are not in contact with the ground.

PART 2 - PRODUCTS

2.01 MATERIALS

A. All products, including interior coatings, shall be suitable for use in a potable water system.

B. All products, including wetted parts, shall be certified to meet NSF/ANSI Standard 61.

C. All piping and fittings shall be designed for a working pressure and field hydrostatic test pressure as shown in Section 15051, Buried Piping Installation.

D. Copper pipe: Copper pipe shall conform to the requirements of ASTM B88 and Federal Specification WW-T-799a. Buried copper piping to maximum 2-inch

diameter shall be type K, soft temper, suitable for use with flared fittings. Exposed copper piping shall be Type L hard temper tubing. Fittings shall conform to ANSI B16.22.

E. All copper piping and accessories must be new materials in first-class condition. Used or recycled materials will not be allowed, regardless of condition.

2.02 MARKING

A. All items shall be marked or labeled with the following information:
1. Metal or alloy designation.
2. Temper.
3. Size and schedule.
4. ASTM specification number.
5. Name and location of supplier.

2.03 JOINTING

A. All joints shall conform to manufacturer's recommendations and shall be made by skilled workmen.

B. Joints shall develop full strength and shall be stronger than the pipe joined.

PART 3 - EXECUTION

3.01 GENERAL

A. Refer to Section 15051 for copper piping installation.

B. All connections to copper piping shall be watertight at operating pressure.

C. Copper Tubing
1. Copper tubing shall be installed in accordance with the applicable provisions of Section 02351, Excavation, Backfill and Trenching and Section 15051, Buried Piping Installation.
a. Flared connections shall only be allowed for all buried fittings.
b. No coupling shall be allowed, especially under paved areas. Exception shall be based on the length of the service and the size of the coil of tubing provided and shall be only as allowed by ENGINEER.
c. Installation shall be suitable for open-cut or push or drill methods.
2. Exposed copper tubing shall be carefully erected and neatly arranged.
a. Copper tubing shall be run parallel with walls inside structures and shall be pitched to drain.
b. Drain valves shall be installed at the low points of liquid filled systems.
c. Joints shall be soldered suitable for the pressure intended.

3. Unions shall be provided on copper tubing systems with soldered joints.
   a. Unions shall be located at control valves, solenoid valves, moisture and steam traps, other items of connected equipment and as shown on the Drawings.
   b. Unions shall be of cast bronze or brass construction.
   c. Dielectric unions shall be used when connecting copper tubing to ferrous metals.

END OF SECTION

SECTION 15110

VALVES AND APPURTENANCES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

The work specified shall include all labor, material, equipment, services and incidentals necessary to furnish and install valves and appurtenances as shown, specified and required.

B. Related Work Specified Elsewhere

1. Section 02080 - Fire Hydrants
2. Section 15051 - Buried Piping Installation
3. Section 15106 - Ductile Iron Pipe and Fittings
4. Section 15140 - Testing and Disinfection

1.02 QUALITY ASSURANCE

A. Manufacturer's Qualifications

1. Manufacturer shall have a minimum of 5 years experience producing valves and appurtenances, and shall show evidence of at least 5 installations in satisfactory operation.
2. Parts Interchangeability: It is the intent of these specifications that all materials furnished herein shall be compatible with similar materials of other manufacturer's.

B. Reference Standards

1. ANSI B16.1, Cast Iron Pipe Flanges and Flanged Fittings
2. ANSI B16.4, Cast Iron Fittings
3. ASTM A48, Standard Specification for Gray Iron Castings
4. ASTM A126, Standard Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings
5. ASTM A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
6. ASTM A354, Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs and Other Externally Threaded Fasteners
7. ASTM A436, Standard Specification for Austenitic Gray Iron Castings
8. ASTM A536, Standard Specification for Ductile Iron Castings
9. ASTM B62, Standard Specification for Composition Bronze or Ounce Metal Castings
10. AWWA C500, Standard for Metal-Seated Gate Valves for Water Supply Service
11. AWWA C504, Standard for Rubber-Seated Butterfly Valves

12. AWWA C508, Standard for Swing Check Valves for Waterworks Service, 2 in.(50 mm) Through 24 in. (600 mm) NPS
13. AWWA C509, Standard for Resilient Seated Gate Valves for Water Supply Service
14. AWWA C800, Underground Service Line Valves and Fittings
15. American Gear Manufacturers Association (AGMA) Standards
16. NEMA, National Electrical Manufacturer's Association
17. NEC, National Electrical Code
18. NSF/ANSI Standard 61
19. Underwriter's Laboratories (UL)
20. International Organization for Standardization (ISO)
21. Factory Mutual Research Corporation
22. 1996 Safe Drinking Water Act
23. Manufacturing Standardization Society of the Value and Fittings Industry (MSS)

1.03 SUBMITTALS

A. Shop Drawings: Submit for approval the following:
1. Manufacturer's literature, illustrations, specifications, detailed drawings, data and descriptive literature on all valves and appurtenances.
2. Deviations from Drawings and Specifications.
3. Engineering data including dimensions, materials, size and weight.
4. Fabrication, assembly, installation and wiring diagrams.

B. Operation and Maintenance Data: Submit complete manuals including:
1. Copies of all Shop Drawings, test reports, maintenance data and schedules, description of operation, and spare parts information.

C. Shop Tests: Submit for approval the following:
1. Hydrostatic tests for each valve when required by the valve specifications included herein.
2. Each gate valve shall have the leakage test required by Section 5 of AWWA C509 performed with the pressure differential applied in both directions.
3. The manufacturer of butterfly valves shall submit certified copies of reports covering the bi-directional leakage tests in accordance with Section 6, AWWA C504.

D. Certificates:
1. Where specified or otherwise required by ENGINEER, submit test certificates.
2. The CONTRACTOR shall submit certificates of compliance with the applicable referenced standards.
3. Submit certificate of compliance with NSF/ANSI Standard 61 for all products under this section, including interior coatings, by an independent, authorized laboratory.

E. Delivery Tickets:
   1. Furnish delivery tickets indicating the valve manufacturer, valve type and class, identifying that the valves are new and from a manufacturer that has been submitted and approved.

F. Testing Criteria:
   1. CONTRACTOR must provide manufacturer's test specifications for all tapping sleeve and valves prior to field testing.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. During delivery and handling, all materials shall be braced and protected from any distortion or damage; any such distortion or damage shall be basis for rejection of the materials.

B. Equipment used for unloading shall be covered with wood or rubber to avoid damage to the exterior of the valves and accessories. Do not drop or roll materials off trucks. All valves and appurtenances shall be handled with padded slings or other appropriate equipment. The use of cables, hooks or chains will not be permitted.

C. The materials shall be inspected before and after unloading. Materials that are found to be cracked, gouged, chipped, dented or otherwise damaged will not be accepted.

D. Interiors of valves and appurtenances shall be kept free from dirt and foreign matter.

E. Store valves and appurtenances on heavy wood blocking or platforms so they are not in contact with the ground.

F. Valves and appurtenances shall be unloaded opposite to or as close to the place where they are to be used as is practical to avoid unnecessary handling.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General
   1. All products, including interior coatings, shall be suitable for use in a potable water system.
   2. All products, including wetted parts, shall be certified to meet NSF/ANSI Standard 61.
   3. Valves shall have manufacturer's name and working pressure cast in raised letters on valve body. Valves shall be suitable for test pressures specified in Section 15051, Buried Piping Installation.

4. Manual valve operators shall turn clockwise to close unless otherwise specified. Valves shall indicate the direction of operation.
5. Valve shall be treated as a bulkhead (dead end) condition and pipe joints shall be restrained on both sides of the valve for the lengths as shown, specified, or required.
6. All valves, operators, and appurtenances shall be designed to withstand the working and hydrostatic test pressures as specified in Section 15051, Buried Piping Installation.
7. Unless otherwise specified all flanged valves shall have ends conforming to ANSI B16.1, Class 125.
8. All bolts, nuts and studs shall, unless otherwise approved, shall conform to ASTM A307, Grade B; or ASTM A354. All bolts, nuts and studs on or required to connect submerged or buried valves shall be fluorocarbon coated.
9. Bolts and nuts shall have hexagon heads and nuts.
10. Gasket material and installation shall conform to manufacturer's recommendations.
11. Identification: Identify each valve 4 inches and larger with a brass or stainless steel nameplate stamped with the approved designation. Nameplate shall be permanently fastened to valve body at the factory. Stenciled designations are acceptable for buried valves.
12. All valves and appurtenances must be new materials in first-class condition. Used or recycled materials will not be allowed, regardless of condition.

B. Gate Valves, Flanged and Screwed
1. $2^1/_2$ inches Diameter and Smaller: Valves shall be bronze screwed ends, solid wedge, rising stem, screwed bonnet type with screwed ends.
   a. Product and Manufacturer: Provide one of the following:
      1) Fig. 49-U, as manufactured by Jenkins Brothers or,
      2) Watts - WGV,
      3) Or approved equal.
2. 3-Inch Diameter and Larger:
   a. Valves shall be iron body, bronze mounted, rising stem and in conformance with AWWA C500.
   b. Unless otherwise shown or specified exposed valves shall have flanged ends conforming to ANSI B16.1, Class 125 conforming to ANSI A21.11.
   c. Exposed manually operated gate valve shall be equipped with hand wheels. Gate valves located more than five feet above the operating floor shall be provided with chainwheels, sprockets, and aluminum chain. The chain shall extend to three feet above the operating floor.
   d. Manufacturer: Provide gate valves of one of the following:
      1) Mueller Company,
      2) Dresser Manufacturing Division, M&H Division,
      3) Or approved equal.

C. Resilient Seat Gate Valves

1. General

a. The design working pressure and test pressure for all valve sizes shall be as described in AWWA C509 and materials conforming to C509. All valves shall be designed to operate vertically in a horizontal pipeline.

b. The valve disc shall be fully encapsulated with a synthetic elastomer and shall seat against a corrosion-resistant surface.

c. Valves for buried applications shall have mechanical joint ends and be restrained per Section 15106, Ductile Iron Pipe, Fittings, and Accessories, by use of a mechanical joint wedge action retainer gland to resist movement.

d. All bolts and nuts, including bonnet assembly and seal plate hold-down, shall be fluorocarbon coated high strength, corrosion resistant low alloy steel.

e. Valves for exposed applications shall have flanged ends conforming to ANSI B16.1, Class 125 conforming to ANSI A21.11.

f. Thin walled AWWA C515 valves shall not be allowed.

2. Gate Valve

a. The body, bonnet, seal plate, disc and hub nut shall be iron.

b. Non-rising valve stem, stem nuts, glands and bushings shall be bronze.

c. Shaft "O"-ring seals shall be synthetic rubber or Buna-N and shall be capable of being replaced under pressure.

d. All internal parts shall be accessible without removing the main body from the pressurized line.

3. Operators

a. Operator shall be suitable for buried service.

b. Operators shall be as specified in AWWA C509 for submerged, buried, or in-plant service as specified.

c. Operators shall be equipped with a 2-inch square operating nut and shall be full gasketed and grease packed for buried service. Operating nuts shall turn clockwise to close the valve. A cast arrow showing the direction of valve opening shall be supplied.

4. Manufacturer:

a. Kennedy Valve Company, No. 8571,

b. Mueller, 2360-16,

c. Or approved equal.

D. Butterfly Valves

1. General

a. Butterfly valves shall be short-body design conforming to AWWA C504 and shall have flanged ends for exposed applications and mechanical joint or Victaulic ends for buried applications as specified.

b. Valves for buried applications shall have mechanical joint ends and be restrained per Section 15106, Ductile Iron Pipe, Fittings, and Accessories, by use of a mechanical joint wedge action retainer gland. Valves may also have Victaulic ends as shown, specified, or required.
c. Valves shall be tight closing, rubber seat type with recessed rubber seat securely mounted to the valve body.
d. All other bolts, nuts and studs shall, unless otherwise approved, be flourocarbon coated.
e. Bolts and nuts shall have hexagon heads and nuts.
f. Gasket material and installation shall conform to manufacturer's recommendations.
g. Identification: Identify each valve with a brass or stainless steel nameplate stamped with the approved designation. Nameplate shall be permanently fastened to valve body at the factory.
h. All butterfly valves and their operators shall be designed for buried and submerged conditions and shall open counterclockwise.

2. Butterfly Valve
a. Body shall be cast iron ASTM A126, Class B, with integrally cast shaft bearing hubs. Flanged ends shall conform to ANSI B16.1 and match existing.
b. Valve shafts shall be Type 304 stainless steel solid one piece design for valve sizes 3" through 20" and stub shaft design for valves larger than 24" in diameter with an adjustable thrust bearing to center the valve disc.
c. Discs shall be of one-piece design, cast iron or ductile with a Type 316 stainless steel seating edge with demonstrated test results of 100,000 cycles of drip tight capability.
d. Valve seats shall be synthetic rubber. Rubber seats shall be bonded to the valve body. The seat bond must withstand a 75 pound pull under test procedure ASTM D429, Method B.
e. Valve bearings shall be as specified in Sect. 3, AWWA C504. The shaft bearings shall be teflon or teflon lined/fiberglass backed.
f. Valve shaft packing shall be non-metallic, split-V self-compensating Chevron style.

3. Operators
a. Operators shall be permanently lubricated and totally enclosed and be provided with a handwheel, chainwheel or 2-inch square nut, as specified.
b. Operators shall be equipped with a totally enclosed permanently lubricated lever-traveling nut drive, self locking type and shall be designed to hold the valve in any intermediate position between "fully open" and "fully closed" without creeping or fluttering.
c. Operators shall be equipped with adjustable stop-limiting devices to prevent over travel of the disc in the open and closed positions. Stops shall be located within the operator housing and be capable

of adsorbing the full operator torque with minimum safety factor of 5.

d. Operator housing, supports and connections to the valve shall have provisions for four-bolt mounting.

e. Operator components shall withstand an input torque of 450 foot-pounds at the extreme operator positions without damage.

f. Enclosed lever-traveling nut operators shall have a gear ratio designed not to exceed 80 pounds pull to meet the required operator torque.

g. Operators shall turn clockwise to close the valve.

h. Extension stems shall not be allowed. All valves shall be located such that the cover over the top of the operating nut shall not exceed 5-foot in depth.

4. Manufacturer:

a. Henry Pratt Co, Groundhog,

b. DeZurik,

c. Or approved equal.

E. Tapping Sleeve and Valve

1. Tapping Sleeve

a. Tapping sleeves and valves shall be used for connections larger than 2 inches and shall be stainless steel constructed of 18-8 Type 304 stainless steel.

b. All bolts and nuts shall be 18-8 Type 304 stainless steel, with heavy hex nuts to be fluorocarbon coated to prevent galling.

c. Tapping sleeves shall be designed and sized in accordance with the recommendations of the manufacturer.

d. The sleeve shall be fabricated in two halves, for assembly around the watermain by means of bolts and gaskets to form a watertight seal. Bolts shall be removable and the gasket shall be a 360 degree gridded type to resist oil, alkalies, and suitable for water service.

e. The flange shall be 18-8 type 304 stainless steel, the outlet side shall conform to AWWA C 207 (ANSI B16.1, class 125), 150 lb drilling for attachment to standard tapping valves. 18-8 type 304 stainless steel flange bolts and flange gasket shall be supplied with tapping sleeve.

2. Tapping Saddle for Prestressed Concrete Cylinder Pipe.

a. Tapping saddle assembly shall consist of tapping saddle, steel bands, rubber gasket, and a separate flanged tapping gland.

b. The assembly shall be so designed that the saddle must be installed on the pipe before the prestressing wires can be cut. The gland is to be a separate piece that is installed after the wires are cut and is held against the cylinder by bolting its flange to the flange on the saddle. The outlet on the gland shall allow a tapping valve, as specified herein, to be bolted to it.

3. Tapping Valve (16-inch diameter and smaller):
    a. Valves for tapping sleeves 16-inches and smaller shall be resilient seat as specified in paragraph 2.01.C herein and shall be specially designed for this purpose.
    b. The end flange of the tapping valve shall mate with the flange of the tapping sleeve and conform to AWWA C 207 (ANSI B16.1, class 125), 150 lb drilling and to the dimensions of MSS SP-60. The other end of the tapping valve shall be mechanical joint, unless otherwise specified.
4. Tapping Sleeve Manufacturer for Tapping Ductile Iron, PVC Pipe, or ACP Pipe.
    a. Mueller, Model No. 304,
    b. Ford style FTSS,
    c. Smith Blair 665,
    d. Or approved equal.
5. Tapping Saddle Manufacturer for Prestressed Concrete Cylinder Pipe:
    a. Price Brothers,
    b. Or approved equal.
6. Tapping Valve Manufacturer:
    a. Mueller, No. 2360/2361,
    b. Kennedy No. 8950,
    c. Or approved equal.

F. Check Valves - Liquid Service
1. General:
    a. Check valves shall absolutely prevent the return of water back through the valve when the upstream pressure decreases below the downstream pressure. The valve shall be tight seating.
2. $2^1/_2$-Inches Diameter and Smaller: Valves shall be bronze, screwed ends with screw in cap suitable for 150 psi service.
    a. Product and Manufacturer: Provide one of the following:
        1) Fig. 92-A, as manufactured by Jenkins Brothers,
        2) Fig. 34-1/2, as manufactured by Crane Company,
        3) Or approved equal.

G. Air Release Valves
1. Air release valves shall be designed to operate automatically under pressure to release entrapped air from a watermain, pump, tank, or water system. Once the air has been released, the valve shall close and remain closed until reopened by entrapped air. No leakage or process fluid will be permitted.
2. All internal valve components shall be stainless steel.
3. The air release valve shall be float operated and shall incorporate a compound lever mechanism to enable the valve to automatically release accumulated air from a fluid system that system is pressurized and operating.

4. The air release valve shall close drop tight, incorporating an adjustable Buna-N orifice button.
5. The float shall be stainless steel and be capable of withstanding a test pressure of 300 psi.
6. The linkage/lever mechanism shall be able to be removed from the valve without disassembly of the mechanism, and shall be designed to prevent jamming.
7. The body and cover shall be cast iron conforming to the requirements of ASTM A126 Class B, and shall be designed to withstand a test pressure of 450 psig.
8. Manufacturer:
    a. ValMatic, model #38,
    b. Or approved equal.

H. Combination Air and Vacuum Release Valves
1. Combination air release valves shall be designed to relieve entrapped air and to break a siphon in a pipeline regardless of flow direction.
2. All internal valve components shall be corrosion-resistant.
3. Manufacturer:
    a. ValMatic, valve #201C.2,
    b. Or approved equal.

2.02 PAINTING

A. Shop Painting
1. Clean and prime coat ferrous metal surfaces.
2. All interior wetted ferrous surfaces of valves and appurtenances except finished or bearing surfaces shall be shop-painted with an approved epoxy paint system certified to NSF/ANSI Standard 61 for potable water and applied in accordance with the paint system manufacturer's recommendations.
3. Coat machined, polished and non-ferrous surfaces including gears, bearing surfaces and similar unpainted surfaces with corrosion prevention compound listed in NSF/ANSI Standard 61 and applied in accordance with the manufacturer's recommendations. Maintain coating during storage and until equipment begins operation.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install valves and appurtenances as shown on the Drawings and in accordance with the manufacturer's recommendations.

B. All valves shall be kept in the closed position until otherwise directed by the ENGINEER. Hydrant valves shall be opened during the hydrostatic testing and then closed until the watermain is placed into service.

C. Install all valves so that handwheels, levers, or wrenches can be conveniently turned from operating area and as approved by the ENGINEER.

D. Install all valves plumb and level unless otherwise approved. Valves shall be installed free from distortion and strain caused by misaligned piping, equipment, or other causes.

E. CONTRACTOR shall operate each valve full open to full close in the presence of ENGINEER. The number of turns shall be recorded and provided to OWNER with the Record Drawings.

END OF SECTION

SECTION 15120

PIPING SPECIALTIES AND ACCESSORIES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

1. CONTRACTOR shall provide all labor, materials, equipment, tools, services, and incidentals necessary to furnish and install piping specialties and accessories as shown, specified and required. Included, but not limited to the following: couplings, repair clamps, joint clamps, service saddles, service fittings, water meter fittings, tile set, corporation stops, curb stops, and curb boxes.

B. Related Work Specified Elsewhere

1. Section 02316 - Select Granular Materials
2. Section 02351 - Excavation, Backfill and Trenching
3. Section 15106 - Ductile Iron Pipe and Fittings
4. Section 15107 - Copper Pipe
5. Section 15108 - Thermoplastic Pipe
6. Section 15109 - Prestressed Concrete Cylinder Pipe
7. Section 15110 - Valves and Appurtenances
8. Section 15140 - Testing and Disinfection

1.02 QUALITY ASSURANCE

A. Manufacturer’s Qualifications

1. Manufacturer shall have a minimum of 5 years of experience in the production of substantially similar types of piping specialties specified and shall show evidence of satisfactory service in at least 5 installations.
2. Parts Interchangeability: It is the intent of these specifications that all materials furnished herein shall be compatible with similar materials of other manufacturers.

B. Reference Standards

1. AWWA C104, Cement-Mortar Lining for Ductile Iron Pipe and Fittings for Water
2. AWWA C115, American National Standard for Flanged Ductile-Iron Pipe with Ductile-Iron Pressure Pipe and Fittings
3. AWWA C301, Prestressed Concrete Pressure Pipe, Steel-Cylinder Type, for Water and Other Liquids
4. AWWA C600, Standard for Installation of Ductile-Iron Watermains and Their Appurtenances
5. AWWA C605, Standard for Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water

6. AWWA C651, Standard for Disinfecting Watermains
7. AWWA C800, Underground Service Line Valves and Fittings
8. AWWA C900, Polyvinyl Chloride (PVC) Pressure Pipe, 4-inch Through 12-inch for Water Distribution
9. ASTM A536, Standard Specification for Ductile Iron Castings
10. ASTM B92, Specification for Standard Size Seamless Copper Pipe
11. ASTM B62, Standard Specification for Composition Bronze or Ounce Metal Castings
12. ASTM D2000, Standard Classification System for Rubber Products in Automotive Applications
13. NSF/ANSI Standard 61
14. Underwriter's Laboratories (UL)
15. International Organization for Standardization (ISO)
16. Factory Mutual Research Corporation
17. 1996 Safe Drinking Water Act

1.03 SUBMITTALS

A. Shop Drawings: Submit for approval the following:
1. Manufacturer's literature, illustrations, specifications, detailed drawings, data and descriptive literature on all piping specialties.
2. Deviations from Drawings and Specifications.
3. Engineering data including dimensions, materials, size and weight.
4. Fabrication, assembly, installation and wiring diagrams.

B. Operation and Maintenance Data: Submit complete manuals including:
1. Copies of all Shop Drawings, test reports, maintenance data and schedules, description of operation, and spare parts information.

C. Certificates:
1. Where specified or otherwise required by ENGINEER, submit test certificates.
2. The CONTRACTOR shall submit certificates of compliance with the applicable referenced standards.
3. Submit certificate of compliance with NSF/ANSI Standard 61 for all products under this section, including interior coatings, by an independent, authorized laboratory.

D. Delivery Tickets:
1. Furnish delivery tickets indicating the manufacturer, accessory type and class, identifying that the equipment was new and from a manufacturer that has been submitted and approved.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. During delivery and handling, all materials shall be braced and protected from any distortion or damage; any such distortion or damage shall be basis for rejection of the materials.

B. Handle all materials very carefully. Materials which are cracked, dented or otherwise damaged will not be accepted.

C. The materials shall be inspected before and after unloading. Materials that are found to be cracked, gouged, chipped, dented or otherwise damaged will not be accepted.

D. Interiors of pipe, fittings and accessories shall be kept free from dirt and foreign matter.

E. Store piping specialties and accessories on heavy wood blocking or platforms as necessary so they are not in contact with the ground.

F. Pipe, fittings, and specials shall be unloaded as necessary opposite to or as close to the place where they are to be used as is practical to avoid unnecessary handling.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General
   1. All products, including interior coatings shall be suitable for use in a potable water system.
   2. All products, including wetted parts, shall be certified to meet NSF/ANSI Standard 61.
   3. All piping specialties and accessories must be new materials in first-class condition. Used or recycled materials will not be allowed, regardless of condition.

B. Couplings
   1. Sleeve Type, Flexible Couplings:
      a. Material: Steel, with epoxy coated sleeve.
      b. Gasket: Manufacturer's standard best quality for the service intended.
      c. Bolts and Nuts: Buried or submerged couplings shall be provided with Type 304 stainless steel or fluorocarbon coated bolts and nuts.
      d. Couplings shall be designed for a working pressure and field hydrostatic test pressure as identified in Section 15051, Buried Piping Installation.

e. Harnessing:
   1) Harness couplings to restrain pressure piping. Couplings shall be designed for a working pressure and field hydrostatic test pressure as identified in Section 15051, Buried Piping Installation.
   2) Adjacent flanges shall be tied with bolts of corrosion resistant alloy steel. Provide flange mounted stretcher bolt plates and lugs as required and to be designed by coupling manufacturer, unless otherwise approved.
   3) Conform to dimensions, size, spacing and materials for lugs, bolts, washers and nuts as recommended by manufacturer and approved by ENGINEER for the pipe size, wall thickness and test pressure required. However, the following minimum bolting shall be provided if not specifically stated by the ENGINEER.

Pipe Diameter (In.)	Minimum Number of Bolts	Bolt Diameter (In.)	At (Degrees)
4	2	$^{5}/_{8}$	180
6-8	2	$^{3}/_{4}$	180
10-12	2	$^{7}/_{8}$	180
14-20	4	1	90
24-48	4	$1\text{-}^{1}/_{2}$	90

f. Remove pipe stop unless otherwise shown or specified.
g. Couplings 16-inches to 24-inches shall be furnished as long laying lengths of 16-inches. Couplings over 24-inches shall be furnished as 10-inch lengths.
h. Manufacturer:
   1) Dresser Industries, Style 138, for sizes up to 12-inches, Dresser Industries, Style 38, for sizes over 12-inches,
   2) Smith-Blair, Type 411, (or type 441 where specified),
   3) Or approved equal.

2. Hymax Coupling:
   a. Material: Center sleeve shall be fabricated of high strength carbon steel tubing. Compression end rings to be either one bolt or two fabricated of carbon steel.
   b. Gasket: Two layered gaskets of which the inner ring is removable to expand the range of the coupling. Material shall be EPDM according to NSF61.
   c. Bolts and Nuts: Buried or submerged couplings shall be provided with type 304 stainless steel. Bolts to be coated with an anti-seize coating to prevent galling.

d. Coating: Interior and exterior shall be provided with NFS-61 approved fusion bonded epoxy coating.
e. Harnessing: as specified herein.
f. To be used only when approved by ENGINEER.
g. Manufacturer:
1) Dresser Industries Style 262 for sizes up to 12-inches,
2) Or approved equal.

C. Flanged Coupling Adapter
1. The body shall be ductile iron conforming to ASTM A536. The bolt circle, bolt size, and spacing shall conform to AWWA C115 flange drilling.
2. The follower gland shall be ASTM A536 ductile iron.
3. Gaskets and "O" rings shall be grade 30 standard.
4. Nuts and bolts shall be fluorocarbon coated or Type 304 stainless steel, high strength, low alloy.
5. Provide fusion bonded epoxy coating on the gasket ring and shop prime enamel on the body.
6. Flange coupling adapter shall not be provided with anchor studs, which are not allowed.
7. Flange coupling adapter shall be suitable for use on ductile or cast iron pipe to the outside diameter specified.
8. Flange coupling adapters shall be restrained as shown, specified, or required.
9. Manufacturer:
a. Smith-Blair, Style 912,
b. Dresser, Style 128,
c. Ford FFCA,
d. Hymax 2100,
e. Or approved equal.

D. Restrained Flanged Adapter
1. Restraint shall be accomplished by use of a gland that incorporates wedges that increase their resistance to pull out as pressure or external forces increase.
2. The restrained flange adapter shall be comprised of two rings made of ductile iron conforming to ASTM A536.
3. The restraining ring shall be suitable for flanges conforming to AWWA C115 flange drilling.
4. Nuts and bolts shall be fluorocarbon coated or Type 304 stainless steel, high strength, low alloy.
5. Torque limiting twist off nuts shall be used to insure the proper actuation of the wedges. When the nut is sheared off, a standard hex head shall remain.
6. Provide fusion bonded epoxy coating on the gasket ring and shop primer on the body.
7. Restrained flange adapter shall be suitable for use on ductile iron pipe.

8. Manufacturer:
    a. EBAA Iron, Series 2100 Megaflange,
    b. Or approved equal.

E. Repair Clamps
1. Repair clamps shall be full circle, 18-8 type 304 stainless steel single band provided in minimum length of 12-inches unless otherwise specified. Bands are to be single section for sizes to 12 inches and double sections for sizes over 12 inches.
2. Nuts and bolts shall be Type 304 stainless steel or fluorocarbon coated.
3. Ductile iron lugs shall be field removable.
4. Repair clamps with a separate keeper bar will not be accepted nor repair clamps with two bolts on a 7.5 inch full circle clamp.
5. Grade 60 gasket.
6. When ordered, provide tapped repair clamps with stainless steel outlet taps for corporation stops in CC (AWWA) thread.
7. Manufacturer:
    a. Smith-Blair, Style 226, for sizes to 12 inches,
    Smith-Blair, Style 227, for sizes over 12 inches,
    Smith-Blair, 238 and 239 for tapped clamps,
    b. Dresser, Style 360,
    c. Ford, Style F1, for sizes to 12 inches,
    Ford, Style F2, for sizes over 12 inches,
    d. Or approved equal.

F. Joint Clamps
1. Joint clamps shall be furnished to permanently stop or prevent leaks through the jointing materials of bell and spigot joints.
2. Clamp shall be fully adjustable to provide a close fit on the bell and spigot and shall be designed to be installed on pipes without interruption of water service.
3. Manufacturers standard rubber gasket shall shut the leak off when compressed by the spigot ring drawn up, in turn, by bolts connected to a bell ring.
4. Manufacturer:
    a. Smith-Blair, Style #274,
    b. Dresser, Style 160,
    c. Or approved equal.

G. Service Saddles
1. Service saddles for iron, asbestos-cement pipe or Polyvinyl Chloride (PVC) pipe shall be of the double strap style.
2. Bodies shall be brass alloy conforming to ASTM B62 (85-5-5-5) and a threaded outlet conforming to AWWA C800.
3. Straps shall be high quality silicon bronze, flattened to provide a wider bearing surface to the pipe.
4. Nuts shall be brass alloy as per ASTM B62.

5. Gasket shall be Buna-N rubber in accordance with ASTM D2000.
6. Manufacturer:
    a. Smith-Blair, Style 323,
    b. Ford, Style 202B,
    c. Or approved equal.

H. Services Fittings: Bronze Unions, Couplings and Adapters
1. General
    a. Service fittings shall have a body cast from corrosion resistant bronze in accordance with ASTM B62 (85-5-5-5).
    b. Connections shall meet applicable sections of AWWA C-800 and be suitable for flared connection to type K copper pipe.
2. Manufacturer:
    a. Unions, copper to copper, three parts:
        1) Mueller Co #H-15400,
        2) Ford C22-XX,
        3) Or approved equal.
    b. Unions, copper to copper, two parts:
        1) Mueller Co #H-15405,
        2) Ford C02-XX,
        3) Or approved equal.
    c. Eighth bend coupling with gasket:
        1) Mueller Co #H-15063,
        2) Ford LA02-XX,
        3) Or approved equal.
    d. Quarter bend coupling with gasket:
        1) Mueller Co #H-15068,
        2) Ford L02-XX,
        3) Or approved equal.
    e. Straight male adapter:
        1) Mueller Co #H-15425,
        2) Ford C28-XX,
        3) Or approved equal.
    f. Straight female adapter:
        1) Mueller Co #H-15450,
        2) Ford C21-XX,
        3) Or approved equal.

I. Water Meter Couplings, Flanges and Gaskets
1. Water Meter Coupling:
    a. Meter couplings shall be bronze hex body with iron pipe thread and bronze nut drilled for wire seal.
    b. Manufacturer:
        1) Ford #C38 Body Style A,
        2) Or approved equal.

2. Water Meter Flanges:
    a. Meter flanges shall be bronze, tapped for iron pipe or have male iron pipe thread.
    b. Manufacturer:
        1) Ford #6F or M; and, Ford #7F,
        2) Or approved equal.
3. Water Meter Gaskets:
    a. Gaskets shall be $^{1}/_{8}$-inch thick, not reinforced rubber.
    b. Manufacturer:
        1) Ford: #GT120R, #GT140 and #GT141,
        2) Or approved equal.

J. Water Meter Tile Set
1. The water meter tile set shall be rigid PVC, high insulating "R" value body meter box specially designated for buried meter applications.
2. The water meter tile set shall be designed such that the meter is easily accessible and braced for additional stabilization. No bottom is to be provided.
3. A closed-cell insulation pad or a double lid cover system shall be provided to prevent freezing.
4. The water meter tile set shall be suitable for a minimum depth of cover of 5 feet over the water service tubing.
5. A locking cast iron lid shall be furnished for each tile set.
6. The water meter tile set shall be furnished complete with male I.P. thread inlet and outlet connections, full port angle key at meter inlet, dual check valve at meter outlet, coupling and fittings ready for a complete meter installation.
7. Manufacturer:
    a. Mueller/McCullough Thermo Coil Meter Box,
    b. Ford Pit Setter – PD VHH-188-18-60 for $^{5}/_{8}$-inch x ¾-inch meters, Ford Pit Setter – PD VHH-488-20-60 for 1-inch meters,
    c. Or approved equal.

K. 1 ½-inch and 2-inch Water Meter Tile Set.
1. The water meter tile set shall be suitable diameter to allow for 1 ½-inch and 2-inch meters and shall be constructed of rigid PVC specially designated for buried meter applications.
2. The water meter tile set shall be designed such that the meter is easily accessible and braced for additional stabilization. No bottom is to be provided.
3. The water meter tile set shall be suitable for a minimum depth of cover of 5 feet over the water service tubing.
4. A locking cast iron lid shall be furnished for each tile set. An insulation pad or double lid arrangement shall be provided to prevent freezing.
5. The water meter tile set shall be furnished complete with male I.P. thread inlet and outlet connections, angle key valve at meter inlet, angle key

valve at meter outlet, bypass piping with ball valve, flanged meter couplings, and fittings ready for a complete meter installation.

6. Manufacturer:
   a. Mueller/McCullough EZ-Vault Meter Setter,
   b. Ford Pit Setter-PMBB-688-36HB-60 for 1 ½-inch meters,
      Ford Pit Setter-PMBB-788-36HB-60 for 2-inch meters,
   c. Or approved equal.

L. Corporation Stops
1. Corporation stops shall be furnished with bronze stem, washer, nut, body and key.
2. Corporation stops shall be threaded to conform to AWWA C800 with standard corporation stop thread at the inlet. The outlet shall be fitted with coupling nut for flared tube service unless otherwise specified.
3. Components shall be suitable for operating pressure meeting or exceeding AWWA C-800 criteria for high pressure application.
4. Manufacturer:
   a. Mueller: copper outlet, #B25000, for sizes ¾-inch through 1-inch,
      Mueller: copper outlet, #B25020, for sizes over 1-inch,
   b. Ford: copper outlet, FB600, for sizes ¾-inch through 1-inch,
      Ford: copper outlet, FB600 with L02, for sizes over 1-inch,
   c. Or approved equal.

M. Curb Stops
1. Curb stops shall be manufactured in accordance with AWWA C-800 and shall have all brass components conforming to 85-5-5-5 ASTM B62.
2. Curb stops shall be ball type, quarter turn to open or close, and shall be suitable for potable water service buried application.
3. Components shall be suitable for operating pressure meeting or exceeding AWWA C-800 criteria for high pressure application.
4. Manufacturer:
   a. Mueller:
      1) $^{3}/_{4}$-inch through 2-inch copper to copper: B25204.
      2) $^{3}/_{4}$-inch through 2-inch copper to iron: B25174.
   b. Ford:
      1) $^{3}/_{4}$-inch through 2-inch copper to copper: B22.
      2) $^{3}/_{4}$-inch through 2-inch copper to iron: B21,
   c. Or approved equal.

N. Curb Boxes
1. Curb boxes shall be high quality cast-iron castings suitable for H20 loadings.
2. Boxes shall be two-piece adjustable depth with arch pattern base. An extension stem will not be allowed.
3. Valve box covers shall be marked “water” and shall be cast iron with a brass pentagon plug.
4. Manufacturer:

a. Bibby-LaPerle:
1) For $^{3}/_{4}$-inch and 1-inch; 2 $^{1}/_{2}$-inch shaft: V-009, size 95E,
2) For $1^{1}/_{2}$-inch and 2-inch; 4 $^{1}/_{4}$-inch shaft: V-425, size 145R,
b. Hays,
c. Mueller,
d. Clow - a division of McWane, Inc.,
e. Tyler - a division of McWane, Inc.,

O. Valve Boxes
1. Valves installed in the ground shall be equipped with an adjustable screw type valve box, minimum 1 foot adjustment.
2. The valve box shall have a barrel with a base to fit the valve on which it is to be installed.
3. Valve boxes for gate valves shall be three piece screw type, 5-$^{1}/_{4}$" shaft with No. 6 base and a valve box cover.
4. Valve boxes for butterfly valves shall be two piece screw type, 5-$^{1}/_{4}$" shaft, with integrated base and a valve box cover.
5. Valve boxes shall be high quality cast-iron castings suitable for HS-20 loadings.
6. All valve box parts must be compatible and interchangeable with Buffalo Pipe and Foundry Corp. valve boxes.
7. Valve box covers shall be marked “water” and shall fit properly in the barrel without movement.
8. Manufacturer:
a. Bibby-LaPerle, (Figure V619 for gate, V652 for butterfly valves),
b. Bass & Hays, BH39605,
c. Tyler Union - a division of McWane, Inc. (6860 for gate, 6850 for butterfly valves),
d. Sigma

P. Insulation
1. Materials
a. Watermain, valves, water service piping and fittings and other appurtenances installed where depth of bury is less than 54 inches (4 feet, 6 inches) or where shown on the drawings, shall be fully wrapped with a closed cell polystyrene insulation.

2.02 PAINTING

A. Shop Painting
1. Clean and prime coat ferrous metal surfaces.
2. All interior wetted ferrous surfaces of valves and appurtenances except finished or bearing surfaces shall be shop-painted with an approved epoxy paint system certified to NSF/ANSI Standard 61 for potable water and applied in accordance with the paint system manufacturer’s recommendations.

3. Coat machined, polished and non-ferrous surfaces including gears, bearing surfaces and similar unpainted surfaces with corrosion prevention compound listed in NSF/ANSI Standard 61 and applied in accordance with the manufacturer's recommendations. Maintain coating during storage and until equipment begins operation.

PART 3 - EXECUTION

3.01 GENERAL

A. Install piping specialties and accessories as shown on the Drawings and in accordance with the applicable requirements of Section 15051, Buried Piping Installation.

END OF SECTION

SECTION 15140

TESTING AND DISINFECTION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified
   1. Testing and disinfection of all pressure piping for leakage as specified.
      a. The CONTRACTOR shall furnish all labor, equipment, test connections, vents, water and materials necessary for carrying out the pressure and leakage tests as specified and required.
      b. The work specified shall include all labor, material, equipment, services and incidentals necessary to fill, clean, chlorinate, flush, and test all pipelines which will carry or hold potable water.

B. Related Work Specified Elsewhere
   1. Section 02080 - Fire Hydrants
   2. Section 15051 - Buried Piping Installation
   3. Section 15106 - Ductile Iron Pipe and Fittings
   4. Section 15108 - Thermoplastic Pipe
   5. Section 15109 - Prestressed Concrete Cylinder Pipe
   6. Section 15110 - Valves and Appurtenances
   7. Section 15120 - Piping Specialties and Accessories

C. Description
   1. Permission shall be obtained from the OWNER of the water system before the use of water from any existing system. The CONTRACTOR shall:
      a. Conform to the requirements of the OWNER.
      b. Pay all costs connected with the taking or use of water for any retesting.
      c. The CONTRACTOR shall provide written notice to the Authority and ENGINEER at least three working days in advance of testing and disinfection.
   2. All work under this section shall be performed in the presence of the ENGINEER. A representative of the public health authority having jurisdiction must also be present, as required.
   3. Chlorination shall be scheduled such that sampling and flushing will be performed during normal business hours.

1.02 QUALITY ASSURANCE

A. Reference Standards
   1. AWWA B300, Standard for Hypochlorites
   2. AWWA B301, Standard for Liquid Chlorine

3. AWWA C104, Cement-Mortar Lining for Ductile Iron Pipe and Fittings for Water
4. AWWA C301, Prestressed Concrete Pressure Pipe, Steel-Cylinder Type for Water and Other Liquids
5. AWWA C502, Standard for Dry-Barrel Fire Hydrants
6. AWWA C504, Standard for Rubber Seated Butterfly Valves
7. AWWA C600, Standard for Installation of Ductile Iron Watermains and Their Construction
8. AWWA C651-14, Standard for Disinfecting Water Mains
9. AWWA C900 Polyvinyl Chloride (PVC) Pressure Pipe, 4-inch Through 12-inch for Water Distribution
10. AWWA M55, Manual of Water Supply Practices, PE Pipe-Design and Installation
11. NSF/ANSI Standard 60 and 61 (as applicable)
12. Standard Methods for the Examination of Water and Wastewater, latest edition
13. 1996 Safe Drinking Water Act

1.03 SUBMITTALS

A. The CONTRACTOR shall submit proposed materials, methods, and operations regarding testing and disinfection to the ENGINEER for review prior to the start of testing.

B. CONTRACTOR must provide a sketch to the ENGINEER of the sampling locations identifying at minimum the following:
1. Street names,
2. North arrow,
3. Sampling locations,
4. House numbers of nearest buildings to sampling locations.
5. Other distinguishable landmarks,
6. Any other information as requested by ENGINEER, OWNER, AUTHORITY, or County Health Department.

C. The CONTRACTOR shall submit certification that all backflow preventers (Reduced Pressure Zone attachments) and pressure gauges have been tested and certified within the last year.

D. Qualifications of laboratory analyzing biological samples shall be New York State ELAP certified.

E. Chain-of-Custody forms are to be furnished for all biological samples taken.

F. For flushing operations, ENGINEER shall supply calculations identifying that a minimum 3.0 ft/sec scour velocity has been achieved in the new waterline and that three pipe volumes have passed through it.

G. ENGINEER shall provide pressure testing and leakage test results on the ECWA Pressure Test/Leakage Test form available on the ECWA website.

PART 2 - PRODUCTS

2.01 MATERIALS

A. All products must be suitable for use in a potable water system and NSF-60 certified. All piping, valves, etc. shall be NSF-61 certified.

B. Chlorination shall be by the use of a solution of sodium hypochlorite contained in the pipe or structure as specified. The use of calcium hypochlorite in powdered, granular, or tablet form, shall not be allowed.

PART 3 - EXECUTION

3.01 TESTS ON PRESSURE PIPING FOR POTABLE WATER

A. General

1. Flush, test and disinfect prior to connection to existing watermains as specified below, except as otherwise authorized by the ENGINEER.
2. The length of piping and sections included in the tests shall meet the approval of the ENGINEER; however, the length shall not exceed 2,000 feet in any case. Pressure test of pipe section shall be from valve to valve regardless of watermain size.
3. Notify the ENGINEER 72 hours in advance of testing.
4. Equipment in or attached to the pipes being tested shall be protected. Any damage to such equipment during the test shall be repaired by the CONTRACTOR at his expense.
5. Conduct all tests per AWWA C-600 and C-651, latest editions in the presence of the ENGINEER. Repeat tests in the presence of local authorities having jurisdiction if required by them.
6. CONTRACTOR shall have sufficient personnel at the site for the entire duration of all tests.
7. When piping is to be insulated or concealed in a structure, tests shall be made before the pipe is covered.
8. Provide outlets to flush line, expel air and perform specified tests.
9. Where connections to existing lines are called for only <u>one</u> such connection will be allowed.
10. All fittings, hydrants and appurtenances must be properly braced and harnessed before the pressure is applied. Thrust restraining devices which will become a part of the system must also be tested at the test pressure.
11. When testing absorbent pipe materials such as cement or concrete, the pipeline shall be filled with water at least 24 hours before the test is made.
12. The CONTRACTOR must supply all materials and manpower to perform the tests as specified herein.

13. Testing and disinfection shall be acceptable and approved by the agency of jurisdiction before another connection is made.

B. Initial Flushing

1. CONTRACTOR shall fill and flush new main to remove dirt and miscellaneous debris from the inside of the watermain.
2. CONTRACTOR is responsible for removing all entrapped air during flushing.
3. Flushing must have sufficient flowrate to achieve a fluid velocity of 3.0 feet per second inside the waterline.
4. A minimum 2" tap is required for proper flushing of all watermains having a diameter of 8 inches or less, however, multiple taps or larger taps may be required. ENGINEER shall be responsible for determining necessary connections and providing calculations verifying flushing conditions are met.
5. Refer to AWWA C651, for number of taps required to obtain the minimum 3.0 feet per second flow velocity in all pipes.
6. CONTRACTOR is responsible for providing a water source for flushing. With the permission of the OWNER, an existing watermain may be used as a water source, however, the following restrictions apply:
    a. The CONTRACTOR is not allowed to operate any valves or hydrants or operate any components which belong to the OWNER.
    b. If water is drawn from the existing system, an appropriate backwater preventer such as a Reduced-Pressure Zone (RPZ) device must be used. The RPZ must be tested within one (1) year and approved prior to usage.
    c. Water from flushing procedures must be disposed of properly. Water may be piped or gravity-fed to an existing storm sewer with the ENGINEER'S and the OWNER'S permission if proper erosion control methods to minimize sediment build-up are used. Discharge of water into a roadway or into a parking lot area is strictly prohibited. Water discharging operations shall not cause damage to any public or private property.
7. CONTRACTOR shall partially open and close valves and hydrants several times under expected line pressure to flush foreign material out of the valves and hydrants.
8. Flushing shall continue until three pipe volumes have passed through the new waterline and the water appears sediment-free.

C. Pressure Test

1. Pressure test apparatus must be installed as shown on the Drawings
2. Test pressure shall be as specified in Section 15051, Buried Piping Installation, at the lowest point in the line.
3. Test pressure shall be held on the piping for a period of at least 2 hours, unless a longer period is requested by the ENGINEER, OWNER, or AUTHORITY. Pressure should not fluctuate by more than 5 psi during testing.

4. Pressure gauge must be in good working condition and must be demonstrated to be accurate to the ENGINEER prior to any testing.
5. Gauge must have proper labeling to allow ENGINEER to accurately distinguish the maximum allowable 5 psi change in pressure. Gauge must have markings at no greater than 2 psi increments to allow accurate readings.
6. ENGINEER is responsible for reading the gauge and recording the test results he/she witnesses. Results obtained by the ENGINEER are considered final, and not subject to discussion by the CONTRACTOR.
7. ENGINEER may tap pressure gauge at each reading to ensure needle is measuring pressure accurately.
8. The AUTHORITY reserves the right to read the pressure gauge and record the test results for those lines considered suspect or for potentially inaccurate result recording.
9. ENGINEER shall record pressure at 15 or 30 minute intervals to help determine if the pressure loss is stabilizing.
10. The CONTRACTOR will inform the ENGINEER when to begin the test.
11. If the pressure drop is greater than 5 psi in 2 hours, or if the ENGINEER believes the line is suspect, the CONTRACTOR shall explore for the cause of the excessive leakage and after repairs have been made, the line shall be retested. This procedure shall be repeated until the pressure loss is less than the maximum allowable and the ENGINEER is satisfied.
12. If the pressure drop is 3 psi or greater but less than 5 psi in 2 hours, the CONTRACTOR shall continue the test for another 2 hours. If the pressure drop over the 4 hour period is 5 psi or greater, the test failed and must be repeated after the cause of the leakage is explored and the necessary repairs have been made
13. The ENGINEER shall make a preliminary determination if the test passes or fails based on the pressure and volume losses recorded during testing.
14. After each test, the CONTRACTOR must demonstrate that the test apparatus, including the pressure gauge, is fully functional and accurate. Inaccurate gauges or non-satisfactory equipment will be grounds for test failure, regardless of test results. CONTRACTOR will resupply proper equipment and retest, at his expense.
15. The pressure loss recorded over the 2 or 4-hour test must be acceptable to the County Health Department and AUTHORITY for final hydrostatic testing approval to be given.
16. At the end of the test, the pressure shall be increased to the starting pressure, so that the leakage test data is acquired. See Section D Leakage Test below, for additional information.

HDPE Testing Requirements

1. In conjunction to the requirements above the test procedures for HDPE pipe consists of two steps: 1) the initial phase or expansion phase and 2) the test phase. During the initial/expansion phase, sufficient make-up water shall be added hourly for 3 hours to return to test pressure. During

the test phase, the expansion phase pressure is reduced by 10 psi to test pressure and monitored for at least one hour (3 hours maximum).

2. Under no circumstances shall the total time under test exceed eight (8) hours. If the test is not completed due to leakage, equipment failure or any other reason, depressurize the test section and permit the system eight (8) hours prior to the next testing sequence.
3. In accordance with Section 9.8 of ASTM F2164, the pipe shall pass if the final pressure is within 5% of the test phase pressure for the testing period (3 hours maximum). If the test section fails this test, the CONTRACTOR shall repair or replace all defective materials and/or workmanship at no additional cost to OWNER.

D. Leakage Test
1. The leakage test shall be conducted concurrently with the pressure test.
2. The rate of leakage shall be determined at 15-minute intervals by means of volumetric measurement of the makeup water added to maintain the test pressure. The test shall proceed until the rate of leakage has stabilized or is decreasing below an allowable value, for three consecutive 15-minute intervals. After this, the test pressure shall be maintained for at least another 15 minutes.
   a. At the completion of the test the pressure shall be released at the furthermost point from the point of application.
3. All exposed piping shall be examined during the test and all leaks, defective material or joints shall be repaired or replaced before repeating the tests.
4. The leakage for pressure pipelines shall not exceed the following allowable rates in gallons per hour per 1000 feet of pipe at the test pressure specified in Section 15051, Buried Piping Installation:

Pipe Diameter	Pipe Material	ECWA Allowable Leakage*
4"	PVC, DIP	0.26
6"	PVC, DIP	0.40
8"	PVC, DIP	0.53
10"	PVC, DIP	0.66
12"	PVC, DIP	0.79
16"	DIP, PCCP	1.06
20"	DIP, PCCP	1.32
24"	DIP, PCCP	1.59
30"	DIP, PCCP	1.98
36"	DIP, PCCP	2.38
42"	DIP, PCCP	2.78
48"	DIP, PCCP	3.17

* 75% of allowable leakage per AWWA C600-17.

5. Regardless of the above allowables, any visible leaks shall be permanently stopped.
6. The CONTRACTOR shall provide a meter certified within the last year or a source-water tank/barrel of small enough cross section so that measurable changes in water depth can be accurately recorded. A two hour test is permitted for circular tanks/barrels of 15 inches in diameter or less. A four hour test is required for circular tanks/barrels greater than 15 inches in diameter. If a tank of non-circular cross section or irregular shape is used, and the change in water depth cannot be properly measured, the ENGINEER or AUTHORITY may require the test to be run more than 2 hours until an accurate depth change can be recorded and the ENGINEER is satisfied with the results.
7. The leakage volume recorded over the 2 or 4-hour test must be acceptable to the County Health Department and AUTHORITY for final waterline approval to be given.

3.02 BUTTERFLY VALVE TESTING

A. Each butterfly valve shall have a field leakage test performed with the pressure differential as identified in Section 15051, Buried Piping Installation, applied in both directions. This requirement does not waive the requirements stipulated in AWWA C504.

B. The duration of each field test in each direction shall be a minimum of two (2) hours.

C. The CONTRACTOR shall demonstrate to the ENGINEER'S satisfaction that all system components operate correctly, both individually and as a system. All testing equipment and materials required to perform all tests shall be provided by the CONTRACTOR and demonstrated as functional and accurate to the ENGINEER. Non-functional or inaccurate equipment, regardless of test results, will be grounds for test failure. CONTRACTOR shall resupply proper equipment and retest.

3.03 RESILIENT SEAT GATE VALVE TESTING

A. Each gate valve shall have a field leakage test performed with the pressure differential as identified in Section 15051, Buried Piping Installation, applied in both directions. This requirement does not waive the requirements stipulated in AWWA C509.

B. The duration of each field test in each direction shall be a minimum of two (2) hours unless specifically defined by the ENGINEER.

C. The CONTRACTOR shall demonstrate to the ENGINEER'S satisfaction that all system components operate correctly, both individually and as a system. All testing equipment and materials required to perform all tests shall be provided by the CONTRACTOR and demonstrated as functional and accurate to the

ENGINEER. Non-functional or inaccurate equipment, regardless of test results, will be grounds for test failure. CONTRACTOR will resupply proper equipment and retest.

3.04 TAPPING SLEEVE AND VALVE TESTING

A. Prior to making the tap, gate valves shall have a field leakage test performed with a hydrostatic pressure as identified in Section 15051, Buried Piping Installation, on the open end.

B. Once the system is complete, the valves shall be tested in accordance with the Butterfly and Resilient Seat Gate Valve Testing criteria stated above.

C. The duration of each field test shall be a minimum of two (2) hours unless specifically defined by the ENGINEER.

D. After installation of the tapping sleeve or saddle and prior to tapping the main, the sleeve or saddle shall be air tested in accordance with manufacturers' recommendations. If the results of the air test do not meet manufacturers' specifications, the sleeve or saddle will be replaced and retested until the results are satisfactory.

E. The CONTRACTOR shall demonstrate to the ENGINEER'S satisfaction that all system components operate correctly, both individually and as a system. All testing equipment and materials required to perform all tests shall be provided by the CONTRACTOR and demonstrated as functional and accurate to the ENGINEER. Non-functional or inaccurate equipment, regardless of test results, will be grounds for test failure. CONTRACTOR will resupply proper equipment and retest.

3.05 DISINFECTION

A. Before disinfection, the line shall be cleaned and flushed with clean water as defined in the Initial Flushing section. CONTRACTOR shall provide outlets as required.

B. The chlorine solution shall be admitted to pipelines through corporation stops placed in the horizontal axis of the pipe, to structures by means of tubing extending directly into the structure or other approved methods.

C. CONTRACTOR shall install 2-inch saddles on existing and proposed mains and run 2-inch Type K copper tubing with backflow prevention device to allow for addition of chlorinated water. The rate of chlorine solution flow shall be in such proportion to the rate of water entering the pipe or structure that the resulting free chlorine residual shall be between 50 and 100 milligrams per liter (mg/l). Concentrations over 100 mg/l shall not be allowed to enter the piping system.

D. The placement of chlorine powder or tablets inside the pipe during installation as a means of disinfection will not be allowed.

E. The proposed piping shall be tested in all respects, prior to connecting the second end of the pipe to the existing system and prior to installing the annular fill at casing pipes.

F. All valves to existing mains must be closed during the chlorination process. CONTRACTOR must flush the proposed main through a backflow preventer such as a Reduced Pressure Zone (RPZ) and 2-inch copper until chlorine residual at the opposite end reaches 50 mg/l. All valves to the existing water network are to remain closed until this level is reached. While the chlorinated water is being added, all appurtenances on the main shall be operated so as to completely disinfect the new work. The operation shall be repeated as necessary to provide complete disinfection.

G. Chlorinated water from hydrants and taps must be properly collected and disposed of by the CONTRACTOR. Discharge of chlorinated water into the existing storm sewer or a natural water body shall not be allowed.

H. The chlorine treated water shall be retained in the pipe or structure at least 24 hours, unless otherwise directed. During the retention period all valves and hydrants within the treated sections shall be operated.

I. The chlorine residual shall be not less than 25 mg/l at any point in the pipe or structure at the end of the retention period. CONTRACTOR shall immediately perform final flushing to reduce the retention time high levels of chlorinated water.

J. When making repairs to or when specified, structures and portions of pipelines shall be chlorinated by a concentrated chlorine solution containing between 200 mg/l and 300 mg/l of free chlorine. The solution shall be applied with a brush or sprayed on the entire inner surface of the empty pipes or structures. The surfaces disinfected shall remain in contact with the strong chlorine solution for at least 30 minutes.

K. The CONTRACTOR must use an approved test method, as defined in AWWA C651 and *Standard Methods for the Examination of Water and Wastewater,* to determine chlorine levels. Test strips and test kits will be allowed for testing chlorine levels if the kit is less than six months old, in the original bottle, is not past the expiration date, and has a color coded scale on the side with legible concentrations defined. ENGINEER and AUTHORITY reserve the right to reject test results if the test strip or kit is suspect. Sending samples to an approved laboratory is also acceptable.

3.06 FINAL FLUSHING

A. Upon completion of each disinfecting operation, the CONTRACTOR will be required to empty the contents of the pipe into a tank truck. Dumping into a sewer will only be allowed with approval from the local governing body. In no instance will chlorinated testing or flushing water be emptied onto the roadways, in ditches, culverts, streams, wetlands, or any other natural water body.

B. Final flushing will continue until such time as the chlorine residual is between 0.5 and 1.2 mg/l.

C. Prior to discharging into storm or sanitary sewer systems, and with the written approval of the municipality, the CONTRACTOR shall use a reducing agent (such as sodium thiosulfate) to neutralize any chlorine residual. CONTRACTOR shall prove to the ENGINEER, AUTHORITY and municipality that the water has been properly neutralized prior to discharge using an appropriate testing method.

3.07 BACTERIOLOGICAL TESTING

A. After disinfection and final flushing, a representative of the laboratory hired by the CONTRACTOR shall, in the presence of the ENGINEER, take two bacteriological samples from sampling points at maximum 1,000-foot intervals along the waterline, at every branch off the main line, and at each end of the test section (one immediately after final flushing and a second one after 24 hours) for testing by an ELAP certified laboratory in accordance with the latest Health Department requirements.

B. Should acceptable results not occur after these two consecutive tests, the CONTRACTOR shall, at his expense, repeat the disinfection procedure until safe results are obtained.

C. All precautions shall be taken to maintain dry and sanitary conditions and to prevent contamination of any piping, at the CONTRACTOR'S expense.

D. If, in the opinion of the ENGINEER or AUTHORITY, contamination has occurred, the CONTRACTOR shall repeat the disinfection and bacteriological testing at his cost and expense.

E. Test results from the laboratory shall be sent directly to the ENGINEER. Test results sent through the CONTRACTOR shall not be considered.

F. Bacteriological test results shall expire 30 calendar days after the samples are taken. After 30 calendar days, the CONTRACTOR shall be required to repeat the process, taking two sets of samples and submitting results for review.

G. As per AWWA C651-14 standards, the limit for pipe installed without bacteriological samples being taken is 20 linear feet.

3.08 APPROVAL

A. The ENGINEER shall submit the Waterline Installation Complete Works Approval Report(s) to the Erie County Water Authority for review and processing.

B. Once approval is given, after reconnecting the proposed piping to the existing piping, the CONTRACTOR shall slowly refill the watermain with water and allow it to pressurize so that the ENGINEER may inspect the connections and/or other piping.

C. The CONTRACTOR shall, at his expense, correct any observed defects to the satisfaction of the ENGINEER and OWNER.

END OF SECTION

CONTRACTOR BID

3030 Union Road	PROJECT No.:	202200066	DESIGNED BY: WWW
Cheektowaga, NY 14227	PROJECT Name:	Andrews Avenue	
(716) 684-1510		Watermain Relocation	CHECKED BY: WRW
www.ecwa.org	DATE:	Tuesday, March 22, 2022	PAGE: 1 of 1

The cost estimate herein shall be prepare utilizing the Kandey Contract for Water Distribution System Repairs & Improvements Technical Specifications (ECWA 202100009)

	Bid Item	QTY	Unit Cost	Computed Price
	Item 1A1 - For installing 4-inch to 8-inch Watermain, 6-feet or less cover	650	60.00	39,000.00
	Item 1A2 - For installing 4-inch to 8-inch Watermain, greater than 6-feet of co	300	65.00	19,500.00
	Item 1B2 - For installing 10-inch to 12-inch Watermain, greater than 6-feet of	80	70.00	5600.00
	Item 2A1 - For installing 4-inch to 8-inch Gate Valve	7	1000.00	7000.00
	Item 2B1 - For installing 12-inch Butterfly Valve	2	1200.00	2400.00
	Item 3A1 - For 4-inch to 8-inch Inline Connection - Complete	5	3500.00	17,500.00
	Item 3A2 - For 10-inch to 12-inch Inline Connection - Complete	1	4000.00	4000.00
	Item 3D1 - For Existing Valve Abandonment - Complete	7	750.00	5250.00
	Item 4A1 - For installing New Fire Hydrant Assembly - Complete	1	2200.00	2200.00
	Item 4A2 - For Existing Fire Hydrant Abandonment - Complete	1	750.00	750.00
	Item 5A1 - For installing 4-inch to 8-inch DI Fittings with restraints	30	460.00	13,500.00
	Item 5A2 - For installing 10-inch to 12-inch DI Fittings with restraints	5	500.00	2500.00
	Item 6A1 - For installing Polyethylene Encasement for DI Pipe and Fittings	1050	1.50	1575.00
	Item 7B1 - For Test Pit Excavation and Backfill	25	450.00	11,250.00
	Item 8A1 - For furnishing and installing Select Backfill	630	25.00	15,750.00
	Item 9A1 - For installing 3/4-inch to 1-inch Copper Service Replacement	17	600.00	10,200.00
	Item 9C2 - For installing Temporary 2-inch Blow-off Assembly	6	550.00	3300.00
	Item 12A5 - For Testing and Disinfection of 12-inch Watermain (<200 ft)	80	8.00	640.00
	Item 12B1 - For Testing and Disinfection of 8-inch Watermain (>200 ft)	950	4.00	3800.00
*	Item 13B10 - For Cold Patch (high performance patching material) per 3" dep	220	125.00	27,500.00
			Project Total:	
				$193,215.00

* Temporary restoration of driveway only

Note: Final restoration will be paid under the sewer improvement project.

APPENDIX B

SAMPLE PAYMENT BOND

Payment Bond

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

CONTRACTOR (Name and Address):

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

OWNER (Name and Address):

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

CONTRACT
Date:
Amount:
Description: ERIE COUNTY WATER AUTHORITY
ANDREWS AVENUE WATER SYSTEM IMPROVEMENTS,
PROJECT No. 2022000066

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

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

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

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

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

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

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

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

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

2.2. Defends, indemnifies and holds harmless the OWNER from all claims, demands, liens or suits by any person or entity who furnished labor, materials or equipment for use in the performance of the Contract, provided the OWNER has promptly notified the CONTRACTOR and the Surety (at the addresses described in paragraph 12) of any claims, demands, liens or suits and tendered defense of such claims, demands, liens or suits to the CONTRACTOR and the Surety, and provided there is no OWNER Default

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

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

4.1. Claimants who are employed by or have a direct contract with the CONTRACTOR have given notice to the Surety (at the addresses described in paragraph 12) and sent a copy, or notice thereof, to the OWNER, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

4.2. Claimants who do not have a direct contract with the CONTRACTOR:

4.2.1 Have furnished written notice to the CONTRACTOR and sent a copy, or notice thereof, to the OWNER, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials were furnished or supplied or for whom the labor was done or performed; and

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

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

5. If a notice required by paragraph 4 is given by the OWNER to the CONTRACTOR or to the Surety, that is sufficient compliance.

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

6.1. Send an answer to the Claimant, with a copy to the OWNER, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

6.2. Pay or arrange for payment of any undisputed amounts.

7. The Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

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

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

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

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

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

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

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

15. DEFINITIONS

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

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

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

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

APPENDIX C

SAMPLE PERFORMANCE BOND

Performance Bond

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

CONTRACTOR (Name and Address):

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

OWNER (Name and Address):

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

CONTRACT
Date:
Amount:
Description: ERIE COUNTY WATER AUTHORITY
ANDREWS AVENUE WATER SYSTEM IMPROVEMENTS,
PROJECT No. 2022000066

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the OWNER for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by the OWNER and the contractor selected with the OWNER'S concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the Bonds issued on the Contract, and pay to the OWNER the amount of damages as described in paragraph 6 in excess of the Balance of the Contract Price incurred by the OWNER resulting from the CONTRACTOR Default; or

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

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

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

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

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

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

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

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

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

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

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

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

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

12. Definitions.

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

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

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

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

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

APPENDIX D

ERIE COUNTY WATER AUTHORITY

(Insurance Specifications for Construction Related Contracts)

[THIS FORM IS INTENDED TO BE USED AS AN EXHIBIT OR ADDENDUM TO YOUR PRIMARY CONTRACT—IT SHOULD NOT BE USED BY ITSELF AS A SOLE CONTRACT DOCUMENT]

OWNER - CONTRACTOR ADDENDUM AGREEMENT

This Owner – Contractor Addendum Agreement ("Addendum Agreement") is being entered into by the parties for any and all work done for, with, or on behalf of **[Insert name of Owner], ("Owner"**) by [**Insert name of Contractor] ("Contractor")** as an Addendum Agreement to the primary contract entered into by the parties, a copy of which is attached hereto (referred to hereafter as "Primary Contract" and which includes any written agreement by the parties, including but not limited to any purchase order, proceed order or written estimate).

During the term of an Agent Agreement and/or a Lease Agreement entered into with the Erie County Water Authority an **ACORD25-Certificate of Liability Insurance** and **ACORD 855 NY-NY Construction Certificate of Liability Addendum** shall be provided evidencing the following insurance is currently maintained and in force with an insurance carrier approved to do business in the State of New York and maintaining an A.M. Best Rating of A- or better showing Erie County Water Authority as Certificate Holder. It is our suggestion that you share these requirements with your current insurance agent, broker or insurance company.

Insurance Requirements

Prior to the commencement of any work designated in this Addendum Agreement or in any contract or agreement to which this Addendum Agreement is attached, and until final completion and acceptance of the work, the Contractor, at its sole expense, shall maintain the following minimum insurance on its own behalf, and furnish to the Owner certificates of insurance evidencing same and reflecting the effective date of such coverage as listed below. In no event shall the failure to provide this proof, prior to the commencement of the work, be deemed a waiver by the Owner of the Contractor's obligation to maintain the insurance set forth herein. The insurance required shall not be canceled, not renewed or materially changed subsequent to the issuance of the certificate of insurance required by this Addendum Agreement.

A. Worker's Compensation, Occupational Disease & Employer's Liability Insurance:

Worker's Compensation, Occupational Disease & Employer's Liability Insurance in accordance with the applicable laws and statutes to cover any injuries or illness to employees and any other person eligible for compensation, and the liability of the employer thereof to any person or organization, as follows:

Worker's Compensation & Occupational Disease: Statutory

Employer's Liability: $1,000,000 bodily injury by accident or disease, except for work work/employers subject to the New York Worker's Compensation Law, in which this insurance shall be unlimited.

All such coverage shall: not contain any exclusion for injuries to sole proprietors, partners, members of limited liability companies or executive officers of any corporate entity; and provide for a "Waiver of Subrogation" endorsement in favor of the Owner/Contractor.

Any contractor/subcontractor with a principal place of business located outside of the State of New York must include New York under Part 3A of the policy.

B. <u>Commercial General Liability</u>:

Commercial general liability insurance as provided under the ISO Commercial General Liability Coverage Form, CG 00 01, or its equivalent, for claims of Bodily Injury, Property Damage and Personal and Advertising Injury, with limits of not less than:

Per Occurrence and Personal & Advertising Injury-	$1,000,000.00
General Aggregate & Products/Completed Operations Aggregate-	$2,000,000.00
Fire Damage Legal Liability/Damage to Rented Property-	$100,000.00
Medical Payment (per-person)	$5,000.00

The coverage must include the following:

1. Liability assumed by the insured in an "insured contract" as that term is defined in the ISO Commercial General Liability Coverage Form, CG 00 01.

2. Products/Completed Operations liability for a period of three years after acceptance of the work.

3. A per project aggregate of $2,000,000.00.

4. A "Waiver of Subrogation" Endorsement in favor of the Owner/Contractor.

5. Exterior Insulation Finish System ("EFIS") coverage must be specifically included or provided separately where the Contractor/Subcontractor work under this Agreement or in any contract or agreement to which this Addendum is attached in any way involves EFIS.

6. **The coverage shall not include any provision, definition, exclusion or endorsement which in any way would serve to eliminate the insurance to any insured or additional insured for liability for bodily injury or property damage arising from work performed in New York State, for claims made under the New York Labor Law or for claims made by employees, subcontractors and employees of subcontractors hired to perform work by any insured or additional insured pursuant to work that is subject to this Addendum Agreement or in any contract or agreement to which this Addendum Agreement is attached.**

7. The insurance is to be provided through insurers licensed and admitted to do business in the State of New York, with an A. M. Best financial rating of "A-" or better, or otherwise specifically approved by the Owner.

The Owner, its officers, directors, partners, representatives, agents and employees must be named as Additional Insureds on a primary and non-contributory basis on both the ongoing and completed operations coverage required herein utilizing the ISO

endorsements: CG 2010 04 13 or CG 2038 04 13 (or their equivalent) for ongoing operations; and CG 2037 04 13 (or its equivalent) for completed operations. The Additional Insured coverage shall contain no special limitation or limitation on the scope of the protection afforded to the Additional Insureds.

C. Commercial Automobile Liability Insurance:

Commercial Automobile Liability insurance covering the ownership, maintenance and use of all Owned, Non-Owned and Hired Vehicles by the Contractor with combined Bodily Injury and Property Damage limits including pollution transit coverage of $1,000,000.00 per accident. The Owner, its officers, directors, partners, representatives, agents and employees must be named as Additional Insureds on a primary and non-contributory basis. A "Waiver of Subrogation" in favor of the Owner must be included.

D. Commercial Umbrella/Excess Liability Insurance:

Commercial Umbrella/Excess Liability Insurance with limits of $5,000,000.00 per occurrence and a $5,000,000.00 aggregate. The Owner, its officers, directors, partners, representatives, agents and employees must be named as Additional Insureds on a primary and non-contributory basis. A "Waiver of Subrogation" in favor of the Owner must be included.

E. Pollution Liability:

Pollution liability coverage applicable to the type of work/operations being performed in the amount of $5,000,000.00 per occurrence and $5,000,000.00 aggregate limit. The Owner, its officers, directors, partners, representatives, agents and employees must be named as Additional Insureds on a primary and non-contributory basis. A "Waiver of Subrogation" in favor of the Owner must be included.

F. Builder's Risk/Installation Floater:

"All Risk" Property Insurance coverage afforded by a Builder's Risk/Installation Floater or its equivalent insuring all materials, equipment and supplies provided by the Contractor and intended to become a permanent part of the construction, whether stored on the premises, away from the project site and/or while in transit, in an amount equal to the replacement cost of such materials, equipment and supplies. A "Waiver of Subrogation" in favor of the Owner must be included.

G. Owned and/or Rented Tools or Equipment:

Property insurance covering all owned, rented, leased and/or borrowed tools or equipment of the Contractor or the Contractor's Subcontractors used in connection with the work that is subject to this Agreement or to any contract or agreement to which this Addendum is attached, in an amount equal to the replacement cost of such tools or equipment. A "Waiver of Subrogation" in favor of the Owner must be included.

JOB-SITE SAFETY:

The Owner makes no representation with respect to the physical conditions or safety of the Project Site. The Contractor shall, at its own expense, protect from injury its employees engaged in the performance of the Work. The prevention of accidents to all workers engaged in the Contractor's work and others affected by the Contractor's work is the responsibility of the Contractor. Contractor shall comply with all applicable federal, state, labor and local laws, regulations and codes concerning safety.

WORKERS COMP IMMUNITY WAIVER:

In any and all claims against the Owner by any employee of the Subcontractor, anyone directly or indirectly employed by the Contractor (including any of the Contractor's subcontractors) or anyone for whose acts the Contractor may be liable, the indemnification obligation shall not be limited in by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

HOLD HARMLESS / INDEMNIFICATION:

To the fullest extent permitted by law, Contractor shall defend, indemnify and hold harmless Owner and its heirs, executors, administrators, successors, assigns, affiliates, employees and agents ("Owner Indemnitees") from and against any and all actions, claims, liabilities, damages, losses and expenses, including but not limited to bodily injury, death and property damage, and reasonable attorney's fees and costs (including those incurred in the defense of any such underlying claim, as well as those incurred in the enforcement of this Addendum Agreement and/or in the prosecution of any claim for indemnification by Owner) arising out of or resulting from, or alleged to arise out of or result from, the Contractor's work (including the work by any of the Contractor's subcontractors), except to the extent caused by the negligence or willful misconduct of any Owner Indemnitees.

MISCELLANEOUS:

In the event that any term or provision of this Addendum Agreement conflicts with or is otherwise inconsistent with any term or provision in the Primary Contract or any prior written agreement entered into between the parties, the terms and provisions contained herein shall govern and control.

This Addendum Agreement shall be binding upon and inure to the benefit of the parties hereto and their successors and permitted assigns. This Addendum Agreement, its terms and any claims arising therefrom, shall be interpreted and construed in accordance with the laws of the State of New York.

This Addendum Agreement may be executed via facsimile or email in any number of counterparts, all of which taken together shall constitute one and the same agreement. No waiver by a party of any breach by the other party of any of the provisions of this Agreement shall be deemed a waiver of any preceding or succeeding breach of the same or any other provisions hereof. No such waiver shall be effective unless in writing and then only to the extent expressly set forth in writing.

No modification or amendment of this Addendum Agreement shall be effective unless in writing and signed by both parties. If any term or provision of this Addendum Agreement shall to any extent be invalid or unenforceable, the remainder of this Addendum Agreement shall not be affected thereby and each provision of this Addendum Agreement shall be valid and enforceable to the fullest extent permitted by law.

Certificates of Insurance should be e-mailed to mmusarra@ecwa.org or mailed to Ms. Molly Jo Musarra, Claim Representative/Risk Manager Erie County Water Authority, 295 Main Street – Room 350, Buffalo, New York 14203-2494, or If you have any questions you can contact Ms. Musarra by e-mail or phone (716) 849-8465.

OWNER (Signature)	CONTRACTOR (Signature)
(Print name and title)	(Print name and title)
Date:	Date:

APPENDIX E

[THIS FORM IS INTENDED TO BE USED AS AN EXHIBIT OR ADDENDUM TO ANY SUBCONTRACT—IT SHOULD NOT BE USED BY ITSELF AS A SOLE CONTRACT DOCUMENT]

ADDENDUM AGREEMENT

This Addendum to the Agreement ("Addendum Agreement") between **[Insert name of Upstream Contractor or Upstream Subcontractor]** (hereinafter referenced as "Contractor") and **[Insert name of Downstream Subcontractor]** (hereinafter referenced as "Subcontractor") is being entered into by the parties for any and all work done for, with, or on behalf of **the Erie County Water Authority** (hereinafter the "Authority") under the Primary Contract No._____, Project No. _____ [**Insert Project Description**] with **[Insert name of Contractor]**, a copy of which may be obtained from **[Insert name and contract information of the entity]**.

In accordance with the terms and conditions of the Primary Contract No. _____ entered into with the Erie County Water Authority, an **ACORD25-Certificate of Liability Insurance** and **ACORD 855 NY-NY Construction Certificate of Liability Addendum** shall be provided evidencing the following insurance is currently maintained and in force with an insurance carrier approved to do business in the State of New York and maintaining an A.M. Best Rating of A- or better showing the Authority as Certificate Holder and additional insured. You should share these requirements with your current insurance agent, broker or insurance company.

Insurance Requirements

Prior to the commencement of any work designated in any contract or agreement to which this Addendum Agreement is attached, and until at least the final completion and acceptance of the work under the contract or agreement to which this Addendum Agreement is attached, the Subcontractor, at its sole expense, shall maintain the following minimum insurance on its own behalf, and furnish to the Authority certificates of insurance evidencing same and reflecting the effective date of such coverage as listed below. In no event shall the failure to provide this proof, prior to the commencement of the work, be deemed a waiver by the Authority of the Subcontractor's obligation to maintain the insurance set forth herein. The insurance required shall not be canceled, not renewed, or materially changed after the issuance of the certificate of insurance required by this Addendum Agreement.

A. Worker's Compensation, Occupational Disease & Employer's Liability Insurance:

Worker's Compensation, Occupational Disease & Employer's Liability Insurance in accordance with the applicable laws and statutes to cover any injuries or illness to employees and any other person eligible for compensation, and the liability of the employer thereof to any person or organization, as follows:

Worker's Compensation & Occupational Disease: Statutory

Employer's Liability: $1,000,000 bodily injury by accident or disease, except for work work/employers subject to the New York Worker's Compensation Law, in which this

insurance shall be unlimited.

All such coverage shall: not contain any exclusion for injuries to sole proprietors, partners, members of limited liability companies or executive officers of any corporate entity; and provide for a "Waiver of Subrogation" endorsement in favor of the Owner/Contractor.

Any Contractor/Subcontractor with a principal place of business located outside of the State of New York must include New York under Part 3A of the policy.

B. <u>Commercial General Liability</u>:

Commercial general liability insurance as provided under the ISO Commercial General Liability Coverage Form, CG 00 01, or its equivalent, for claims of Bodily Injury, Property Damage and Personal and Advertising Injury, with limits of not less than:

Per Occurrence and Personal & Advertising Injury-	$1,000,000
General Aggregate & Products/Completed Operations Aggregate-	$2,000,000
Fire Damage Legal Liability/Damage to Rented Property-	$ 100,000
Medical Payment (per-person)	$ 5,000

The coverage must include the following:

1. Liability assumed by the insured in an "insured contract" as that term is defined in the ISO Commercial General Liability Coverage Form, CG 00 01.

2. Products/Completed Operations liability for a period of three years after acceptance of the work.

3. A per project aggregate of $ 2,000,000.

4. A "Waiver of Subrogation" Endorsement in favor of the Owner/Contractor.

5. Exterior Insulation Finish System ("EFIS") coverage must be specifically included or provided separately where the Contractor/Subcontractor work under this Agreement or in any contract or agreement to which this Addendum is attached in any way involves EFIS.

6. The coverage shall not include any provision, definition, exclusion or endorsement which in any way would serve to eliminate the insurance to any insured or additional insured for liability for bodily injury or property damage arising from work performed in New York State, for claims made under the New York Labor Law or for claims made by employees, subcontractors and employees of subcontractors hired to perform work by any insured or additional insured pursuant to work that is subject

to this Addendum Agreement or in any contract or agreement to which this Addendum Agreement is attached.

7. The insurance is to be provided through insurers licensed and admitted to do business in the State of New York, with an A. M. Best financial rating of A- or better, or otherwise specifically approved by the Owner.

The Authority, its officers, directors, partners, representatives, agents and employees must be named as Additional Insureds on a primary and non-contributory basis on both the ongoing and completed operations coverage required herein utilizing the ISO endorsements: CG 2010 04 13 or CG 2038 04 13 (or their equivalent) for ongoing operations; and CG 2037 04 13 (or its equivalent) for completed operations. The Additional Insured coverage shall contain no special limitation or limitation on the scope of the protection afforded to the Additional Insureds.

C. **Commercial Automobile Liability Insurance**:

Commercial Automobile Liability insurance covering the ownership, maintenance and use of all Owned, Non-Owned and Hired Vehicles by the Subcontractor with combined Bodily Injury and Property Damage limits including pollution transit coverage of $1,000,000.00 per accident. The Authority, its officers, directors, partners, representatives, agents and employees must be named as Additional Insureds on a primary and non- contributory basis. A "Waiver of Subrogation" in favor of the Authority must be included.

D. Commercial Umbrella/Excess Liability Insurance:

Commercial Umbrella/Excess Liability Insurance with limits of $5,000,000.00 per occurrence and a $5,000,000.00 aggregate. The Authority, its officers, directors, partners, representatives, agents and employees must be named as Additional Insureds on a primary and non-contributory basis. A "Waiver of Subrogation" in favor of the Authority must be included.

E. Pollution Liability:

Where the Subcontractor is performing work that is subject to this Addendum Agreement or to any contract or agreement to which this Addendum Agreement is attached, that involves abatement or remediation of hazardous substances or any manner of environmental work, pollution liability coverage applicable to the type of work/operations being performed in the amount of $5,000,000.00 per occurrence and $5,000,000.00 aggregate limit. The Authority, its officers, directors, partners, representatives, agents and employees must be named as Additional Insureds on a primary and non-contributory basis. A "Waiver of Subrogation" in favor of the Authority must be included.

F. Builder's Risk/Installation Floater:

"All Risk" Property Insurance coverage afforded by a Builder's Risk/Installation Floater or its equivalent insuring all materials, equipment and supplies provided by the Subcontractor and intended to become a permanent part of the construction, whether stored on the premises, away from the project site and/or while in transit, in an amount equal to the replacement cost of such materials, equipment and supplies. A "Waiver of Subrogation" in favor of the Authority must be included.

G. Owned and/or Rented Tools or Equipment:

Property insurance covering all owned, rented, leased and/or borrowed tools or equipment of the Subcontractor or used by the Subcontractor in connection with the work that is subject to this Agreement or to any contract or agreement to which this Addendum is attached, in an amount equal to the replacement cost of such tools or equipment. A "Waiver of Subrogation" in favor of the Authority must be included.

JOB-SITE SAFETY:

The Authority makes no representation with respect to the physical conditions or safety of the Project Site. The Subcontractor shall, at its own expense, protect from injury its employees engaged in the performance of the Work. The prevention of accidents to all workers engaged in the Subcontractor's work and others affected by the Subcontractor's work is the responsibility of the Subcontractor. Subcontractor shall comply with all applicable federal, state, labor and local laws, regulations and codes concerning safety.

For purposes of this Addendum Agreement, "Project Site" means the entire construction site or the various separately identifiable part of the site described in any contract or agreement to which the Addendum Agreement is attached, and as described in the Primary Contract with the Authority.

WORKERS COMP IMMUNITY WAIVER:

In any and all claims against the Authority by any employee of the Subcontractor, anyone directly or indirectly employed by the Subcontractor (including any of the Subcontractor's subcontractors) or anyone for whose acts the Subcontractor may be liable, the indemnification obligation shall not be limited by any limitation on the amount or type of damages, compensation or benefits payable by or for the Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

HOLD HARMLESS / INDEMNIFICATION:

To the fullest extent permitted by law, Subcontractor shall defend, indemnify and hold harmless the Authority and its heirs, executors, administrators, successors, assigns, affiliates, employees and agents (hereinafter referenced as "Owner Indemnitees") from and against any and all actions, claims, liabilities, damages, losses and expenses, including but not limited to bodily

injury, death and property damage, and reasonable attorney's fees and costs (including those incurred in the defense of any such underlying claim, as well as those incurred in the enforcement of this Addendum Agreement and/or in the prosecution of any claim for indemnification by Authority) arising out of or resulting from, or alleged to arise out of or result from, the Subcontractor's work (including the work by any of the Subcontractor's subcontractors), except to the extent caused by the negligence or willful misconduct of any Owner Indemnitees.

MISCELLANEOUS:

If any term or provision of this Addendum Agreement conflicts with or is otherwise inconsistent with any term or provision in the Primary Contract or any prior written agreement entered between the parties, the terms and provisions contained herein shall govern and control. This Addendum Agreement shall be binding upon and inure to the benefit of the parties hereto and their successors and permitted assigns. This Addendum Agreement, its terms and any claims arising therefrom, shall be interpreted and construed in accordance with the laws of the State of New York.

This Addendum Agreement may be executed via facsimile or email in any number of counterparts, all of which taken together shall constitute one and the same agreement. No waiver by a party of any breach by the other party of any of the provisions of this Agreement shall be deemed a waiver of any preceding or succeeding breach of the same or any other provisions hereof. No such waiver shall be effective unless in writing and then only to the extent expressly set forth in writing.

No modification or amendment of this Addendum Agreement shall be effective unless in writing and signed by both parties and approved in writing by the Authority. If any term or provision of this Addendum Agreement shall to any extent be invalid or unenforceable, the remainder of this Addendum Agreement shall not be affected thereby, and each provision of this Addendum Agreement shall be valid and enforceable to the fullest extent permitted by law.

[Insert name of Upstream Contractor or Upstream Subcontractor]	**[Insert name of Downstream Subcontractor]**
[Insert Name of Representative]	[Insert Name by Representative]
(Print name and title)	(Print name and title)
Date:	Date: